SATO

DCS & Labelling Worldwide

BARCODE PRINTER
DR300

OPERATOR MANUAL

SATO

DCS & Labelling Worldwide

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CHAPTER 1
Installation and Handling Instruction

Installation and Operation Instruction

Place of Installation
- Place on level surface
- Avoid vibration
- Avoid high temperature and humidity
- Avoid dusty environment

Power Supply
- AC220/240V power supply is needed
- Supply electricity from main power supply
- Three pin earthed power lead is required
- A maximum of 3 amp fuse link is recommended

CHAPTER 2
Unpacking - Printer Unit

Remove the equipment from the carton box.
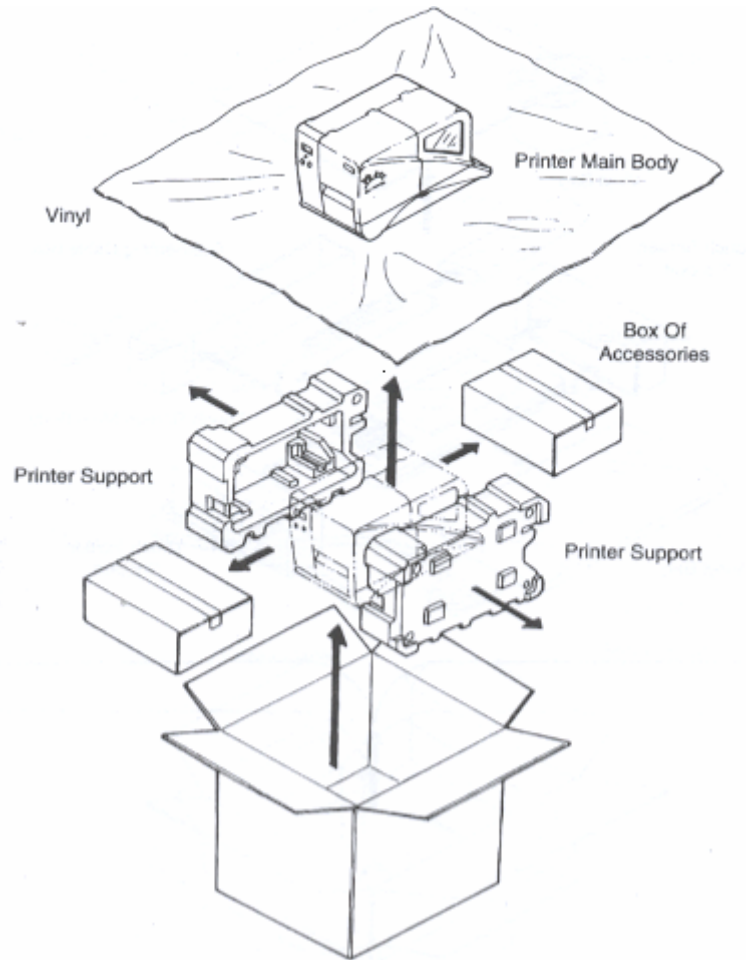
Unpacking - Touch Screen (Optional Item)

Remove touch screen from the carton box.
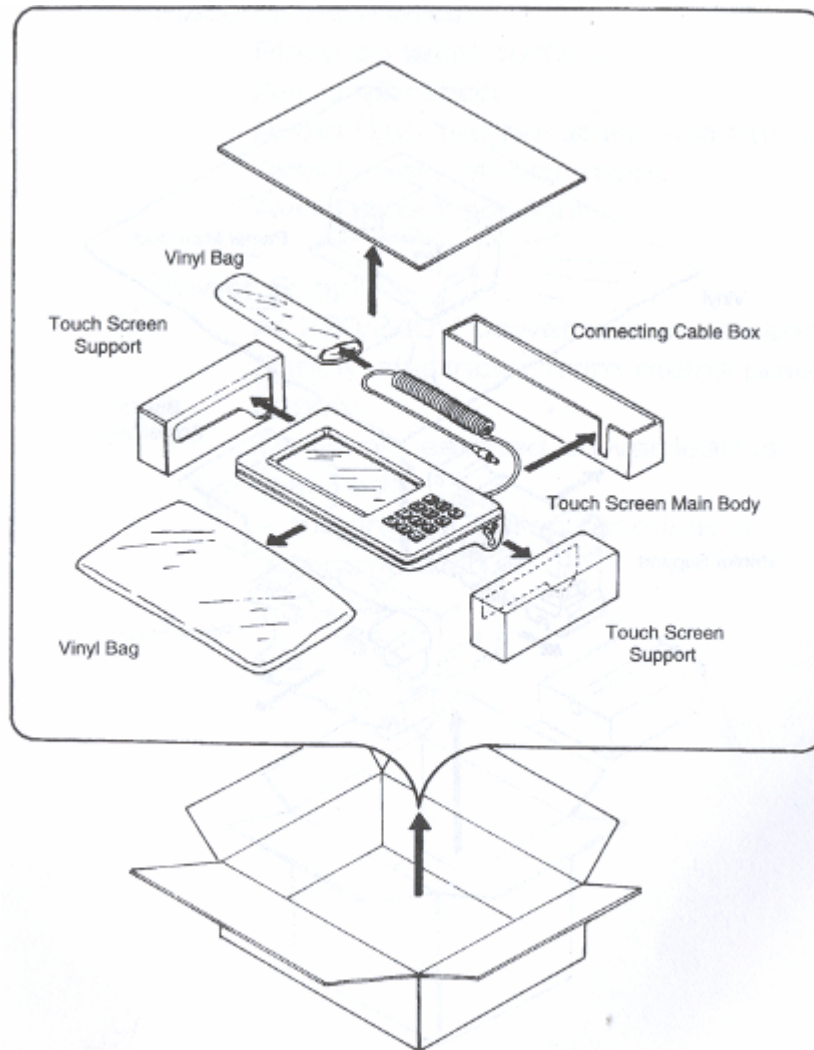
Accessories Checklist

When the box is opened, confirm if the following accessories are included. If anything is found missing, contact the sales outlet of the dealer from where you purchased.

Rubbing Sheet

Label Core

Guide Plate

Ribbon Core

Power Cable

CHAPTER 3
Names of Parts

Printer cover

Power Switch
Push - side for Power on
Push 0 side for Power off

Fuse
Fuse blows off to
protect the equipment
from unstable power
supply surge

Sliding Guide
Aligns Label

Card Cover
PC card slot, DIP-switch and
Adjustable Variable Resistor
(VR) can be found when the
card cover is opened

**AC Input Power Terminal
(Power Connector)**
Supplies power to the
equipment by inserting the
power cable

Touch Screen / Keypad
The touch screen is connected to printer main body with a cable.
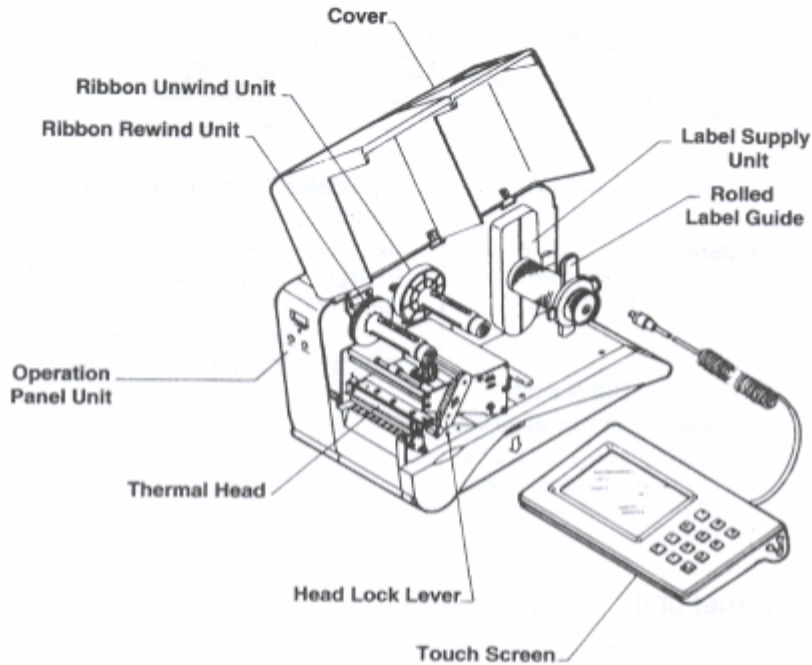
Operational Panel Unit
Displays operation message and error message

Display
- ❖ Display error and operation message.
- ❖ Display will be de-activated when Touch Screen is connected.

STATUS
Displays status of printer
Green: Printing and data communication are enabled
Red: Error occurred
No Light: Printing and data communication prohibited

FEED
Feed key: Feeds Label
- Press FEED key to align label to correct position after changing new label roll

LINE
Line Key: Switch Start/Stop printing and switch ON/OFF data transmission

Card Cover Unit

PC Card Slots
PCcard slots for memory card.
(Refer to Chapter 7 for details)

DIP-Switch
Sets printer operation conditions.

Adjustable Variable Resistor
Variable control for service adjustment.
Do not alter unless specially instructed.
PRINT : For print darkness adjustment.
OFFSET : For cut, dispense, tear off
               position adjustment.
PITCH : For pitch adjustment.

Back Panel Unit

RS-232C
(Serial Interface)
Connector

EXT Connector
Connector for external
signal interface.

KB
Connector for Touch
Screen

From VR1 toVR6
For factory variable resistor (Do not
alter unless specially instructed).

CHECK PIN
For factory adjustment (Do not
touch unless specially instructed).

CHAPTER 4
Setting of Label and Carbon Ribbon

Setting Paper

The use of SATO recommended labels for this equipment is essential.

Rolled Label
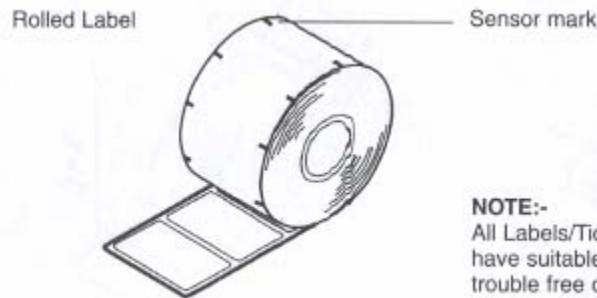
Setting Rolled Paper
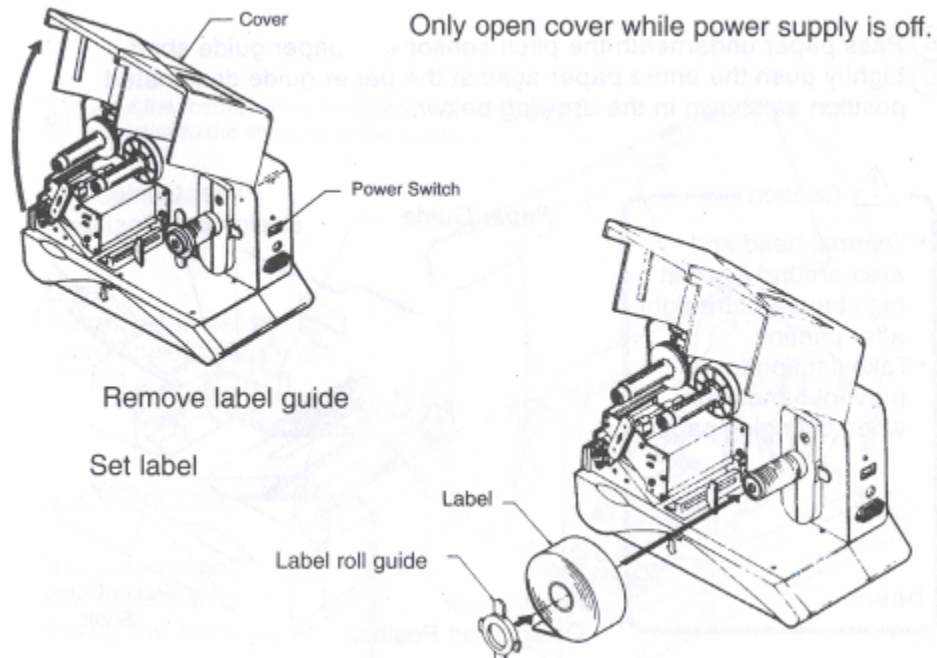
- To open thermal head, turn Head Lock Lever in the direction of the arrow.

Head Lock Lever
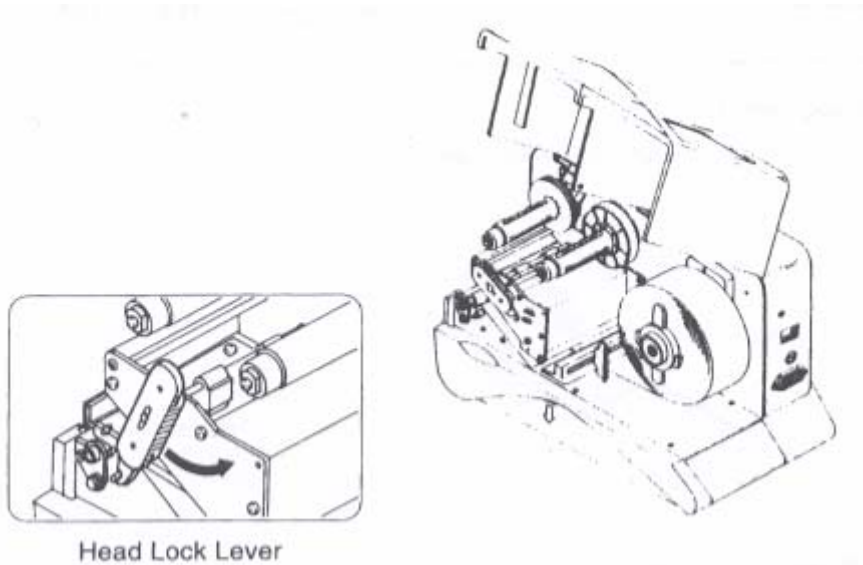
- Pass paper underneath the Pitch Sensor and Guide Shaft.
- Lightly push the entire paper against the Paper Guide designated position as shown in the picture below.

⚠ Caution

- Thermal head and area around it are at high temperature right after printing.
- Take caution to prevent hand injury when changing paper.

Paper Guide

Paper Guide Designated Position

Front Cover Designated Position

Paper Guide Shaft

Pitch Sensor
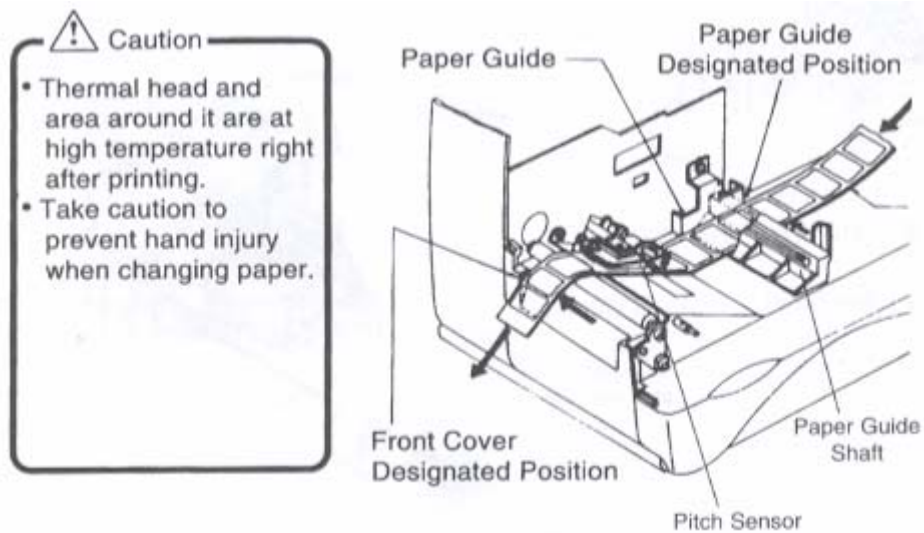
- Adjust the Sliding Guide until it touches the label.

Sliding Guide
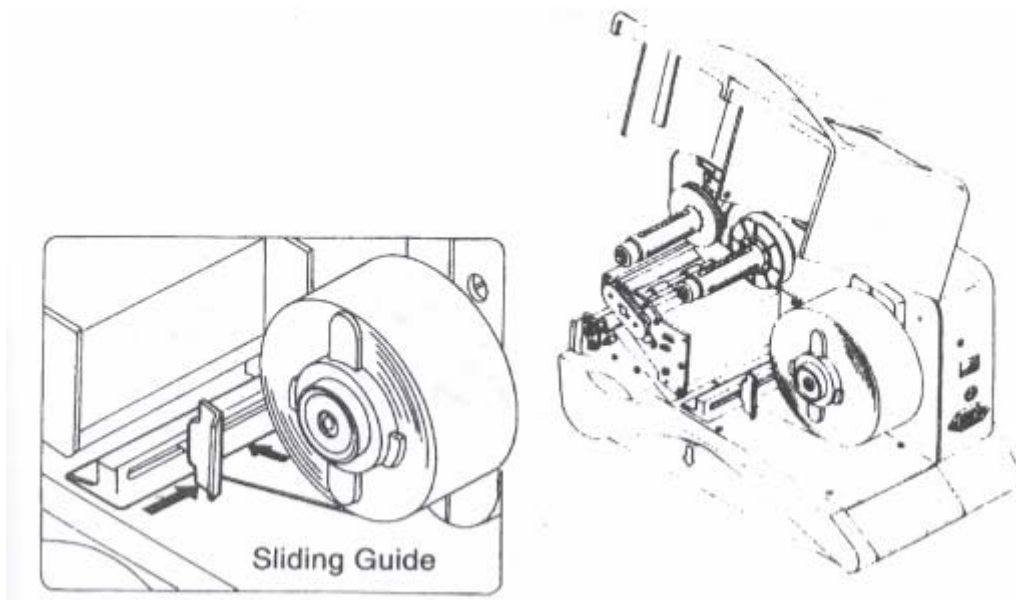
- Close the thermal head by turning the Head Lock Lever to the opposite direction of the arrow.
- Close cover.

NOTE

For thermal transfer mode, ensure ribbon is correctly installed.

Cover

⚠ Caution

- Take caution not to trap your fingers when closing the cover.

Head Lock Lever
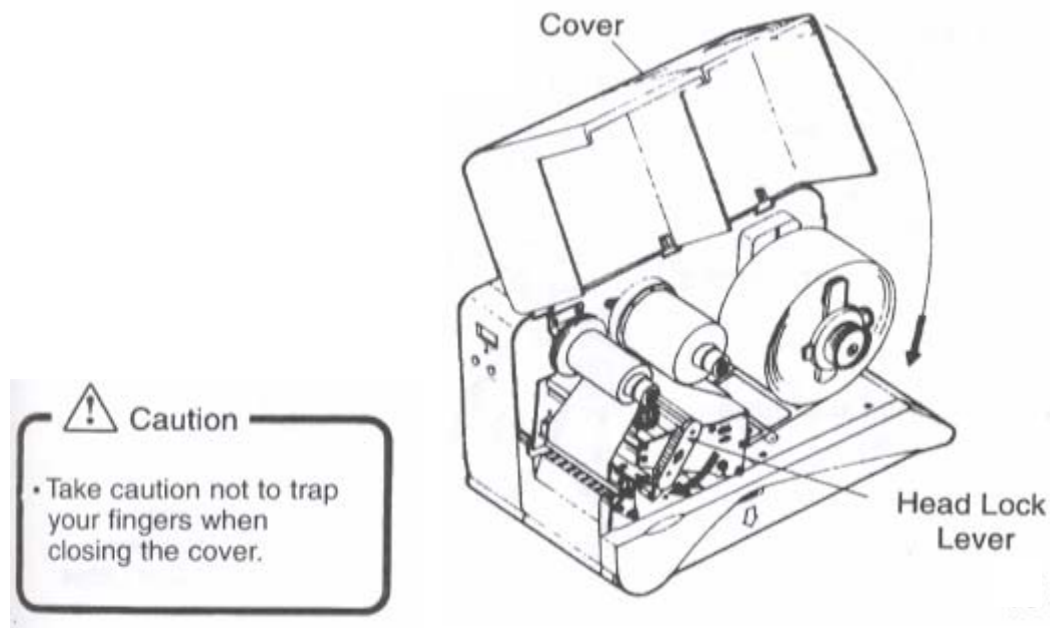
Setting Large Diameter Rolled Label

Setting Large Diameter Rolled Paper.

- Remove right half of the cover fastened with Snap Rivets.
- Pull out 3 Snap Rivets on the Cover by pushing their centre with finger.
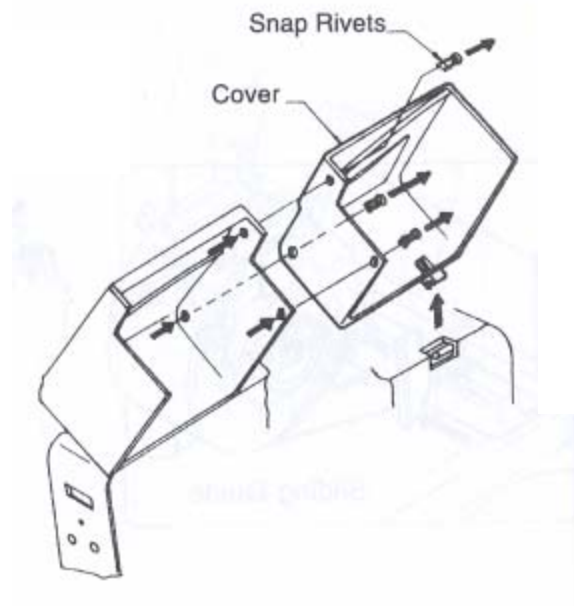
- Alter set position of the Label Holder.
- Alter position of Set Screw.
- Insert Guide Plate in label supply component and Rolled Label Guide.
- Set Large Diameter Rolled Paper.
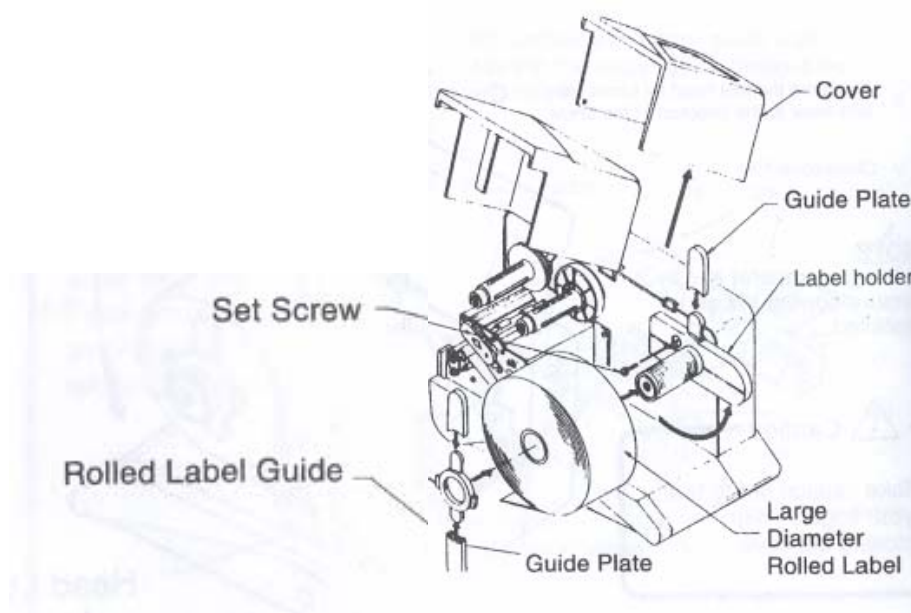
Setting Carbon Ribbon

Only SATO carbon ribbons are recommended for the use on this printer.

- Open Cover while power is OFF.
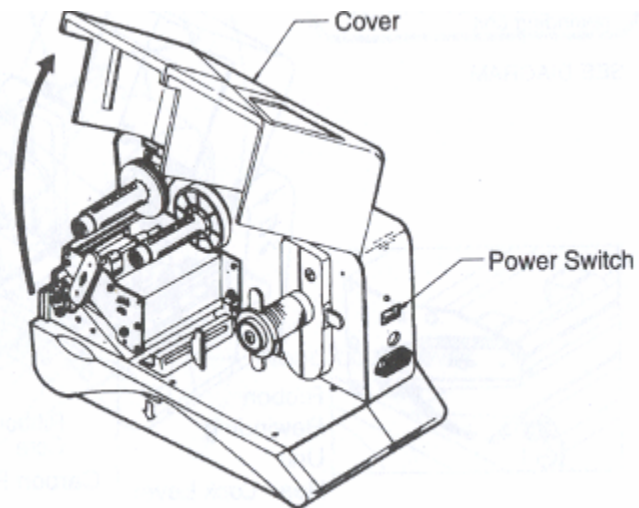
- Open thermal head.
- Turn Head Lock Lever in the direction of the arrow.
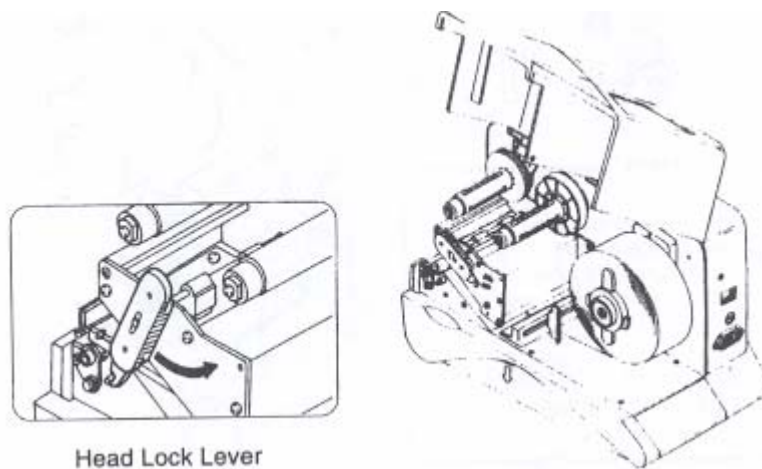
- Insert Carbon Ribbon fully into the Ribbon Unwinder Unit. (Caution on direction of unwinding)
- Set Ribbon Core on Ribbon Rewinding Unit.

Ribbon load diagram

Ribbon Unwinder unit

Ribbon Rewinding Unit
Head Lock Lever

Ribbon Core
Carbon Ribbon
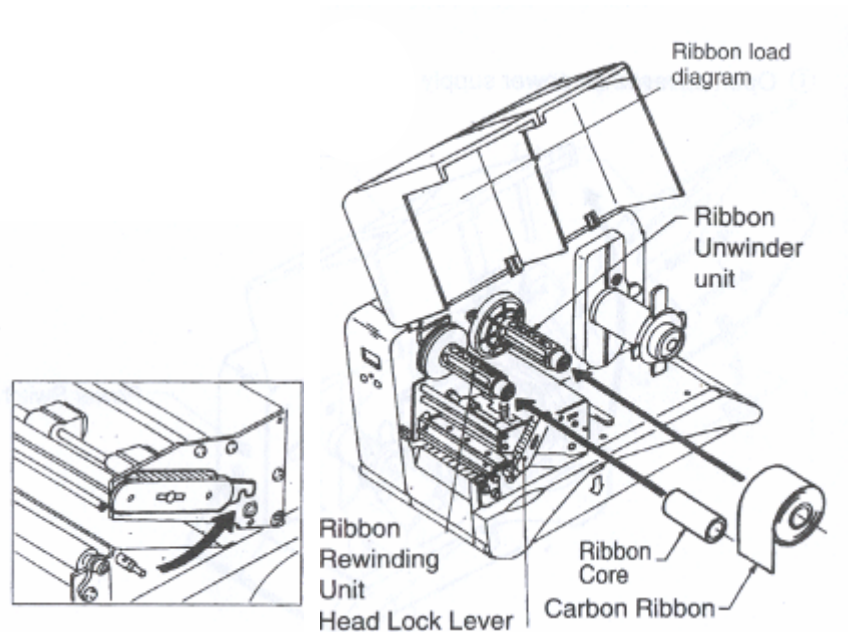
- Pass Carbon Ribbon from Ribbon Unwinder Unit to Ribbon Rewinding Unit underneath the thermal print head. Fix Carbon Ribbon Core with tape, etc. and wind several times in the direction of the arrow. Confirm carbon ribbon is set as the drawing on the left side by viewing from its side.

Carbon Ribbon

Tape

Carbon Ribbon

⚠ Caution

- Thermal head and area around it are at high temperature right after printng. Take caution not to get burnt.

- Take caution to prevent hand injury when changing ribbon.
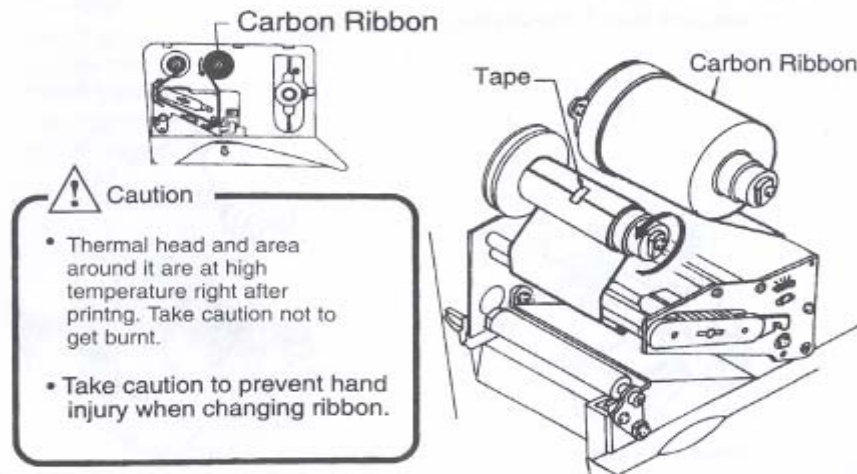
- By turning the Head Lock Lever to the direction of the arrow, close the thermal head.
- Close Cover.

Take caution not to trap your finger when closing the cover
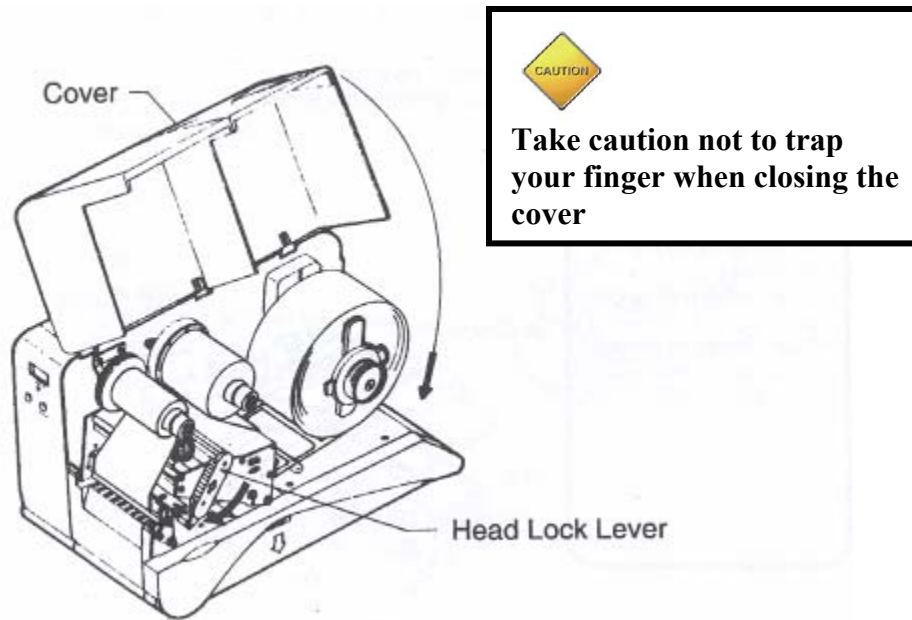
Pitch Sensor Adjustment

- Open Cover when power is OFF.
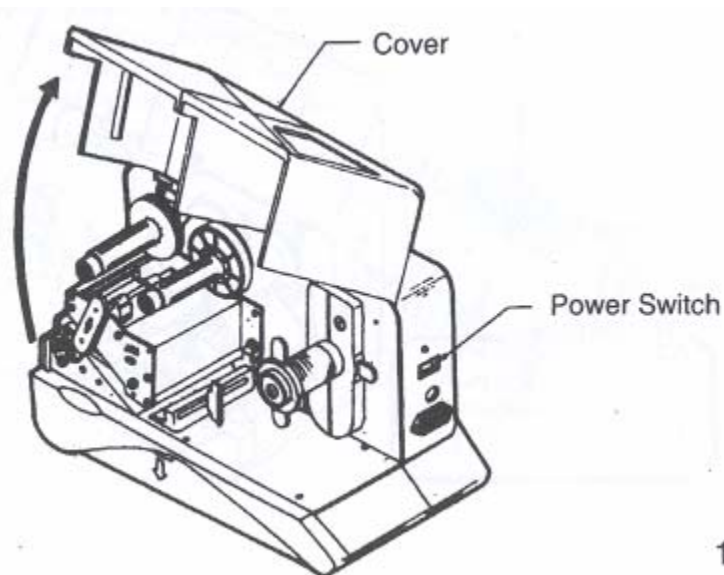
- Pitch sensor adjustment
  Slide pitch sensor to locate centre hole.
  This needs to be done when using tickets/tags with through punch hole only.
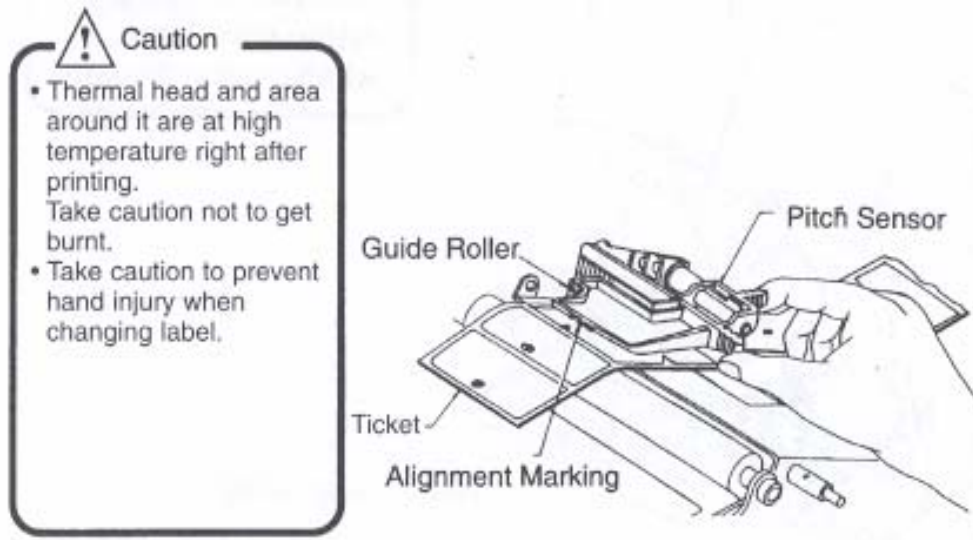
- Turn Head Lock Lever to the direction of the arrow, close thermal head and close cover.
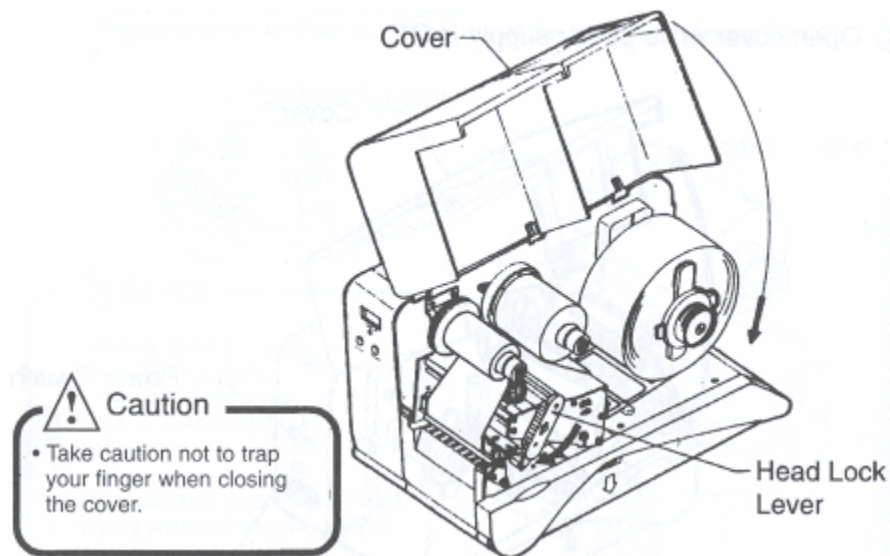
Setting Rolled Paper with Optional Accessories

Dispenser Option
Dispenser Option should only be fitted by qualified SATO staff

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Setting Label
- Open Cover
- Set Label
- Open thermal head by raising Head Lock Lever
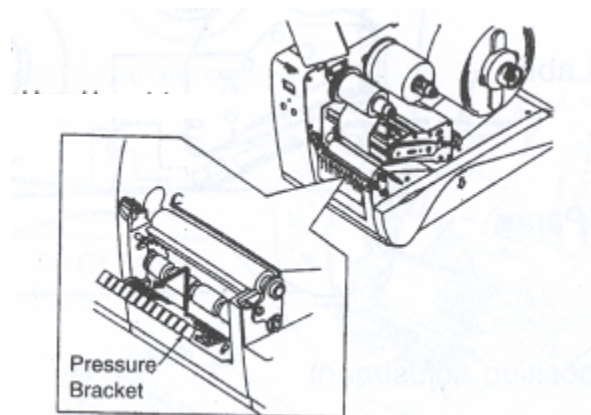
- Pull up Pressure Bracket of dispenser unit once, then pull down.

- Set label
- When setting label on dispense unit, peel 3 to 4 labels from backing paper and pass the backing paper under the Pressure Bracket as shown below.
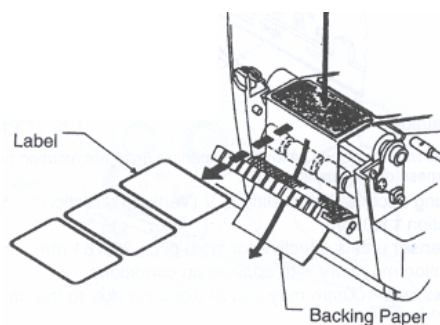
- Lock the print head after label is set, then close the Pressure Bracket.

- Close Cover.
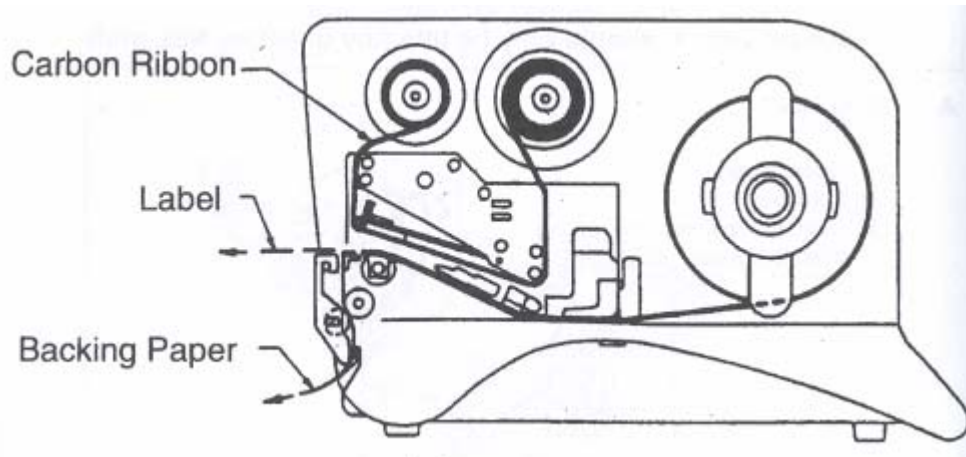
Stop Position Adjustment

The correct stop position for dispense mode is the position where label is 2-3mm on backing paper. Adjust OFFSET (VR) to obtain correct stop position.
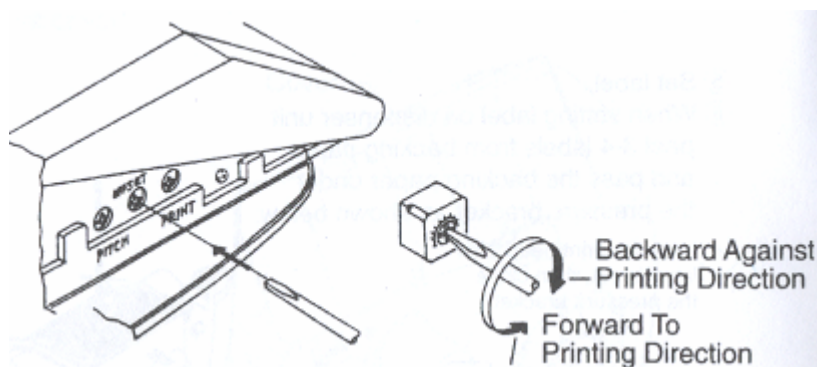
- **There may be cases when the dispenser does not function properly due to the thickness of the labels used.**
- **Printing accuracy at peeling is V (Vertical) direction ± 1.5 mm, label size direction ± 1.0mm.**
- **Dispenser unit is effective for label pitch 25-181mm. However, label size limitation may vary with application conditions.**
- **Labels over 100mm may curl at dispense due to the nature of the material. There is no remedy for this.**

> **Cutter Option**
> **Cutter should only be fitted by qualified SATO staff**

Paper Set Position

- Open Cover
- Set label
- Open thermal head by raising Head Lock Lever
- Set the tip of the label on Platen Roller
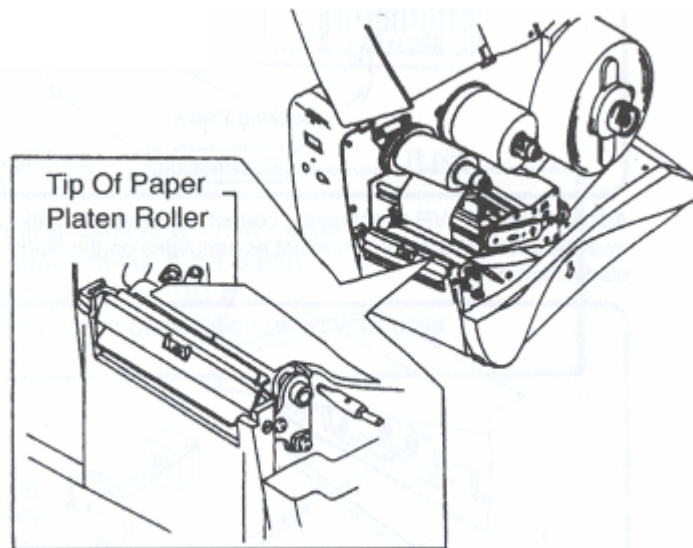
- Open thermal head
- Close Cover
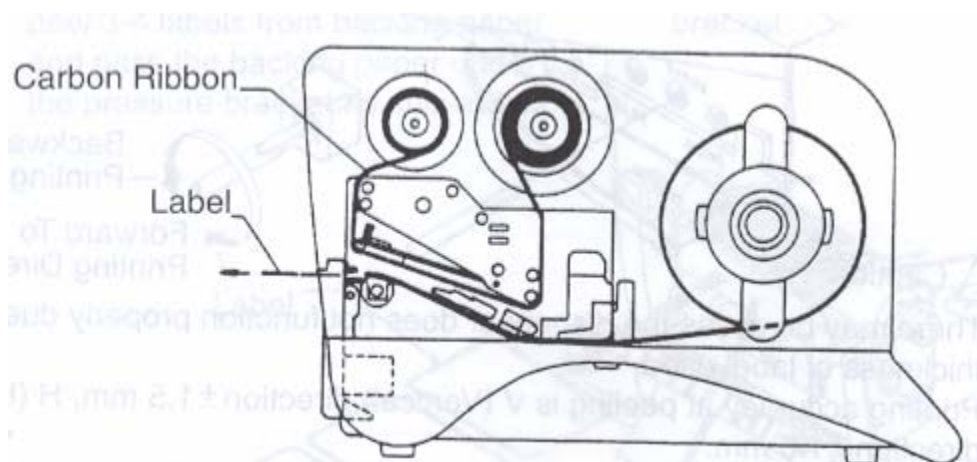
Cut Position Adjustment

Cutting of Label

The correct cutting position is at the label gap.

(Fig 1)   (Fig 2)
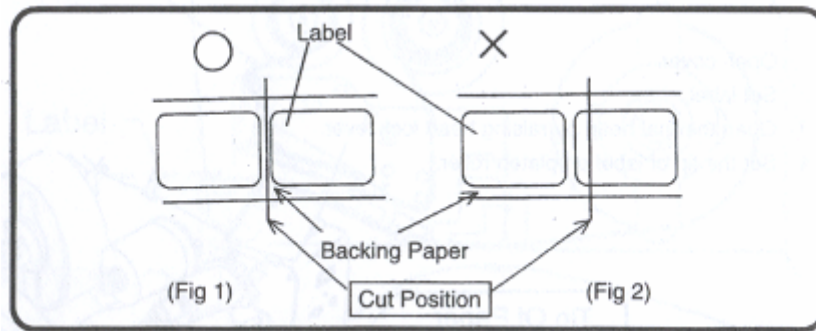
Adjust "OFFSET" VR to obtain the correct position. Cutting onto the label must be avoided because the glue that accumulates on the blade will affect cutter sharpness.
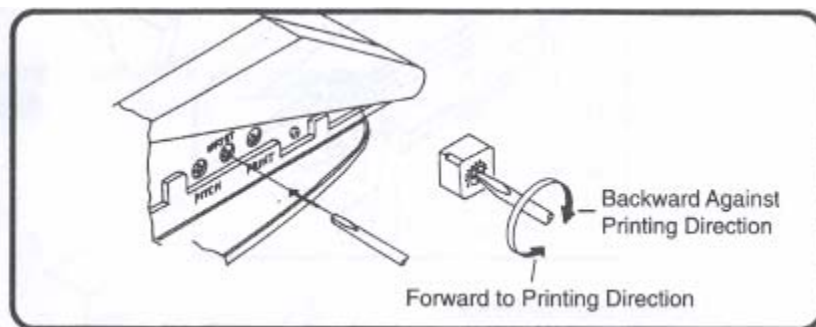
Cutting Paper with Perforation

As for paper with perforation, ± 1mm from perforation is the non-cut area. Adjust "OFFSET" VR to obtain correct cut position.
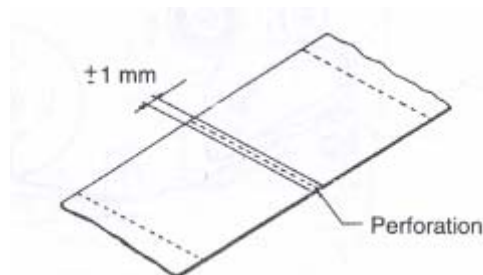
Cutter Replacement

Replace cutter unit when blade becomes blunt and cut edges are rough. (Please contact the sales outlet where you purchase the DR300.)
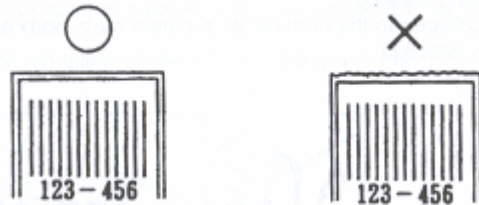
- **Paper thickness 0.1 mm – 0.26 mm**
- **Accuracy of cuts is ± 1.5 mm**
- **Paper pitch 25 – 181 mm**
- **± 1 mm from perforation is non-cut area**

Stacker Option

Stacker
- Set Stacker in front of the cover of the printer main body as shown in the following drawing.
- Attach the stacker to the front cover of the printer main body as shown in the arrow direction.
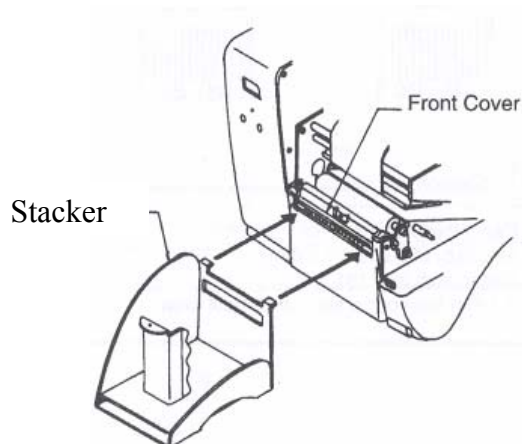
Basic Usage of Stacker
- First adjust the scale position (inclination of bottom plate) corresponding to the size of paper by loosening the stacker screw.
- Adjust the according to the label pitch for a good collecting position.
- The number of sheets that can be stacked varies with the scale position and paper thickness.

Stack Position Adjustment, Standard Pitch Tag
(Tag with pitch greater than 40mm)
- Set stacker scale in between from [Standard pitch] to [Large pitch].
- Determine Tag Guide position by matching with the size of tag to be cut.
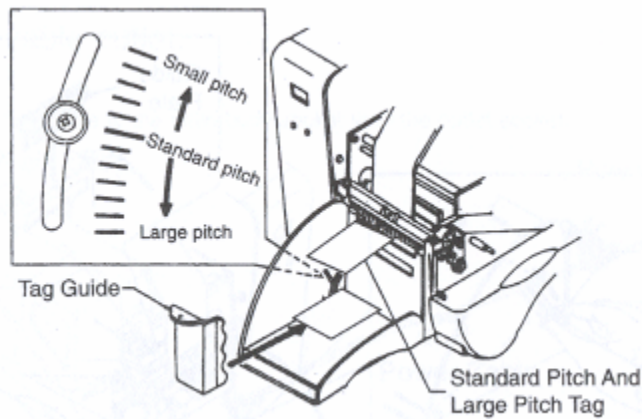
Tag Guide Set Position

When setting Tag Guide, set it with space of approximately 3mm on printer main body side and approximately 3mm on side of Tag as shown in the following drawing.
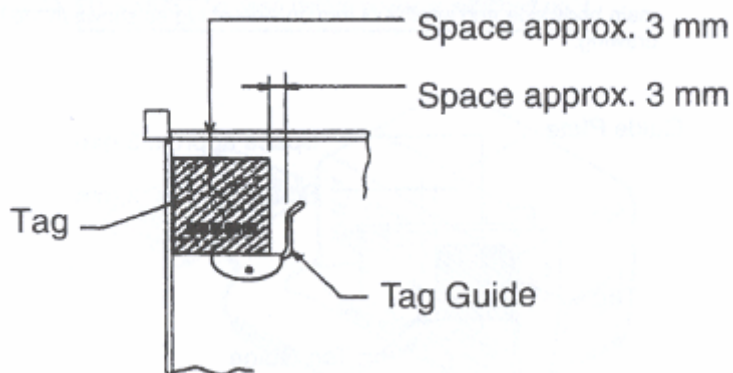
Stack Position Adjustment, Small Tag (Less than 35mm)
- Set Stacker scale in between from [Standard pitch] to [Small pitch].
- Set Guide Plate to stacker as shown in the following drawing. This Guide Plate prevents overturning when small pitch tag is issued.
- Determine Tag Guide position by matching to the size of tag to be cut.
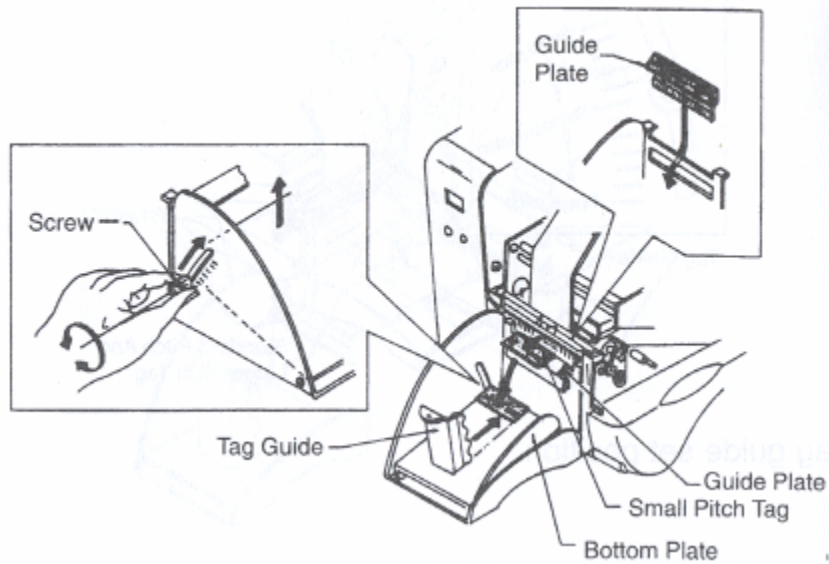
Tag Guide Position

When setting Tag Guide, set it with space of approximately 3mm on printer main body side and approximately 3mm on side of Tag as shown in the following drawing.
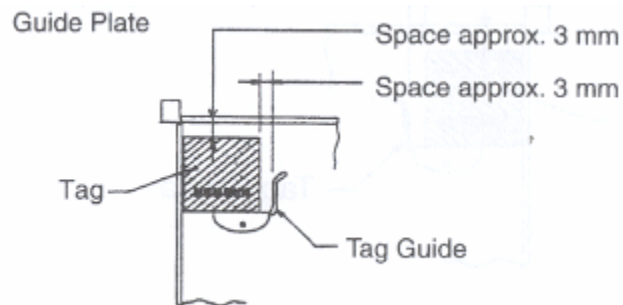
CHAPTER 5
Power Supply

Setting Power Supply

Plug in power cable to main body socket then the outlet socket.
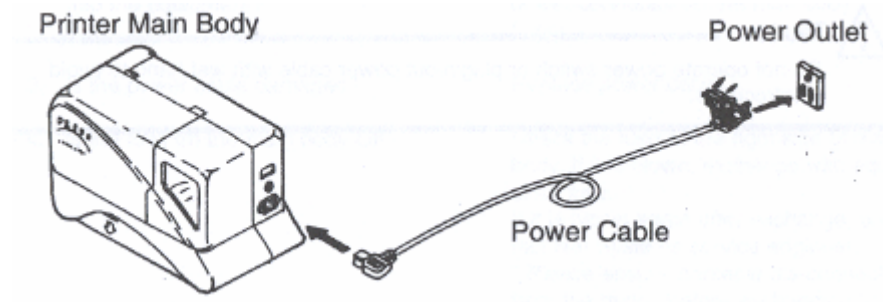
Supply Power

Turn power switch on. Push the switch on the side labelled [-].
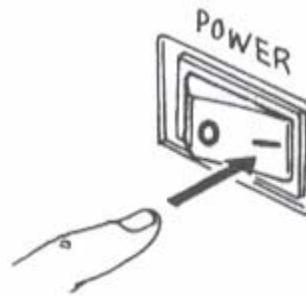
When the power is switched on, initial startup message [Manual Print Mode] is displayed on the touch screen.

Switch off Power Switch

The following must be done before power off:
- Confirm printer is not in action (idling).
- Stop or pause any printing process before power off.

Do not operate power switch or plug in / out power cable with wet hands to avoid electrocution.

Simple Troubleshooting

Confirm the following items when operation of this equipment failed even though power supply is switched on.

<u>Nothing is shown on the display</u>

Check Point	Remedy
1. Is the power cable firmly plugged into the power outlet?	Plug power cable again into the outlet firmly.
2. Is the power cable firmly plugged into the equipment?	Plug power cable again into the power connector on the main body firmly.
3. Is the power cable damaged?	Replace power cable.
4. Is the fuse on the main body blown?	Check the fuse at the right side of main body. If it is blown, replace with equivalent fuse. If it blows again after it is replaced, contact SATO service engineer. *Please ensure printer is disconnected from the mains before exchanging fuse.
5. Is there current supplied to the equipment?	Check power source for power supply outlet. If there is no problem with the power source, check the electricity supply of the building. Check for any power shut down.
6. Is the power source fuse or the circuit breaker for the building blown or tripped?	Contact the building maintenance office.

- Do not operate power switch or plug in / out power cable with wet hands to avoid electrocution.
- Disconnect printer from mains before cleaning.

<u>Paper feeds, but no printing</u>

Check Point	Remedy
1. Is the thermal head dirty or is there a label stuck on it?	Clean dirt off thermal head with cleaning kit. *Avoid using metallic tools which may damage the print head.
2. Are genuine labels, carbon ribbons exclusively for the equipment being used?	Genuine labels and carbon ribbons exclusively for this equipment must be used. Available from SATO.
3. Is the pitch sensor dirty?	Clean dirt off from pitch sensor with cleaning kit.

- Disconnect printer from mains before cleaning.

<u>Poor print image</u>

Check Point	Remedy
1. Are the labels and carbon ribbons properly set?	Check if labels and carbon ribbon are fixed firmly and at the correct position by lifting head assembly.
2. Is the print darkness too light or too dark?	Re-set the print darkness via user mode setting.
3. Is the platen roller dirty?	Wipe dirt off the platen roller with cleaning kit.
4. Is the thermal head dirty or is there a label stuck on it?	Clean dirt of label glue from thermal head with cleaning kit. Remove label if it is stuck to the print head.
5. Is the label used dirty?	Use clean label.
6. Are genuine labels and carbon ribbons exclusively for the equipment being used?	Genuine labels and carbon ribbons exclusively for this equipment must be used. Available from SATO.

- Disconnect printer from mains before cleaning.

Print image shifts from its position

Check Point	Remedy
1. Are the labels and carbon ribbons properly set?	Check if labels and carbon ribbons are fixed firmly and at the correct position by lifting head assembly.
2. Is the platen roller dirty?	Clean dirt off from platen roller with cleaning kit.
3. Are deformed labels or carbon ribbons being used?	Use genuine SATO new labels and carbon ribbons which are in good condition.
4. Are genuine labels and carbon ribbons exclusively for this equipment being used?	Genuine labels and carbon ribbons exclusively for this equipment must be used. Available from SATO.
5. Is the content of data or signal from the computer correct?	Re-set printer with power off/on. If similar message is displayed, check content of software and communication settings at the computer side.
6. Is the print position offset setting correct?	Adjust the print position offset.

CAUTION

- Disconnect printer from mains before cleaning.

CHAPTER 6
Daily Maintenance

This equipment is for printing information in the form of bar code and character. Periodical preventive maintenance is recommended to keep the printer in good condition.

Frequency for maintenance
- Thermal head, platen roller
      After printing every one roll or 150m of label.
- Others
      After printing every 6 rolls or 900m of label.

Caution for maintenance (take the following precaution in maintenance work)
- The above recommended cleaning frequency is just a guide. Do carry out any cleaning where dirt or dust has gathered.
- Use applicator and cotton wool for cleaning each component. Avoid metallic tools to prevent damage to printer parts especially print head.
- Ensure that power is switched off before performing any cleaning.

Maintenance Method
- A cleaning kit is available from SATO.
      This contains:
      1. Solvent wipes (for print head)
      2. Multi purpose wipes
      3. Air duster
      This will help to keep your printer in working condition.

Cleaning method for printer parts

First remove paper dust with Air Duster

Cleaning of label supply unit and label guide shaft unit.
Label guide shaft unit can be removed by removing set screw.
Clean places indicated by arrows.

Rolled Label Supply Unit (convex area)

Multi purpose wipe

Set Screw

Label Guide Shaft

Solvent wipe
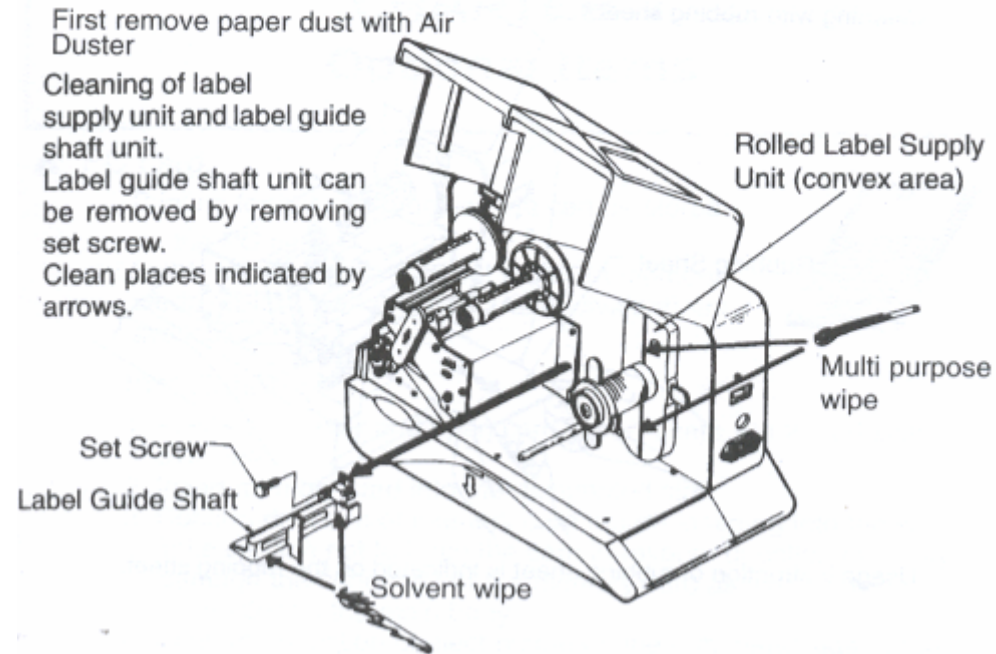
Cleaning for Pitch Sensor Unit.
Pull out Pitch Sensor Guide Unit and clean its bottom portion.
If a label is stuck, remove Pitch Sensor Guide Unit from the Shaft Groove by pulling the Stopper in the arrow direction, pull it out and clean its bottom area.

Stopper

Shaft Groove

Solvent wipe

Pitch Sensor Guide
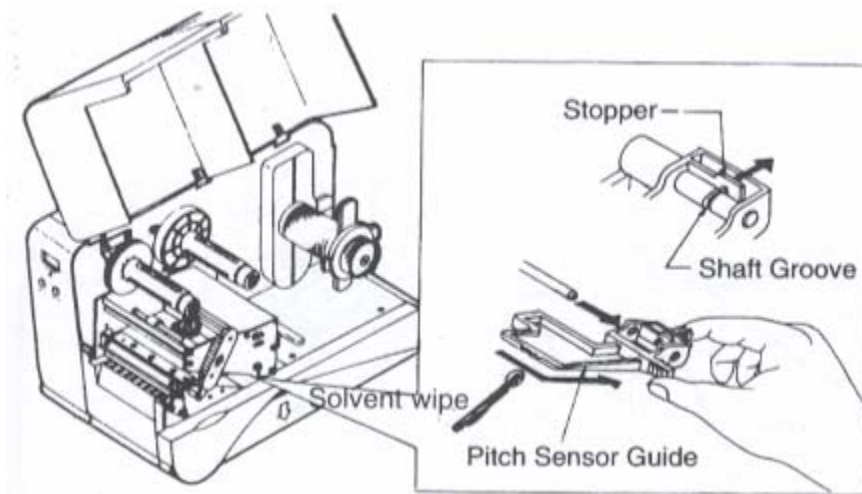
Cleaning with Rubbing Sheet
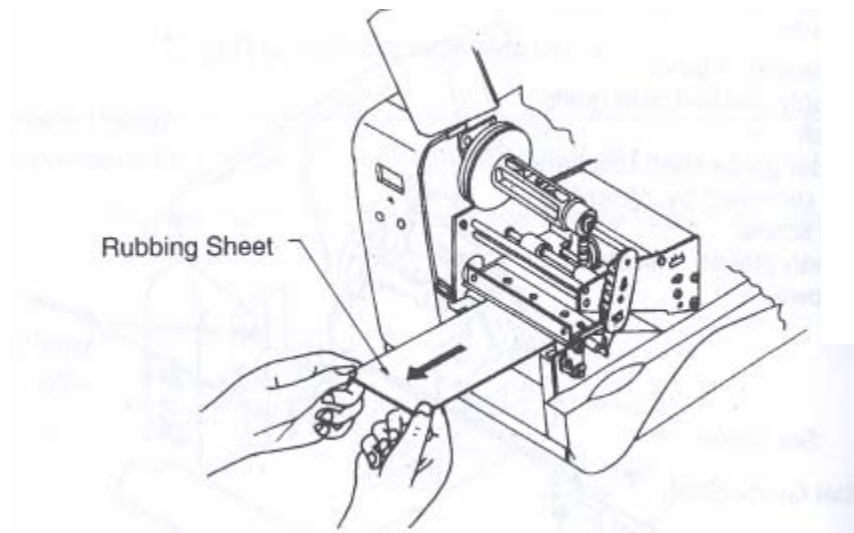
Usage instruction of Rubbing Sheet is indicated on the rubbing sheet.

Thermal Head Unit
Clean Thermal Head and Platen Roller
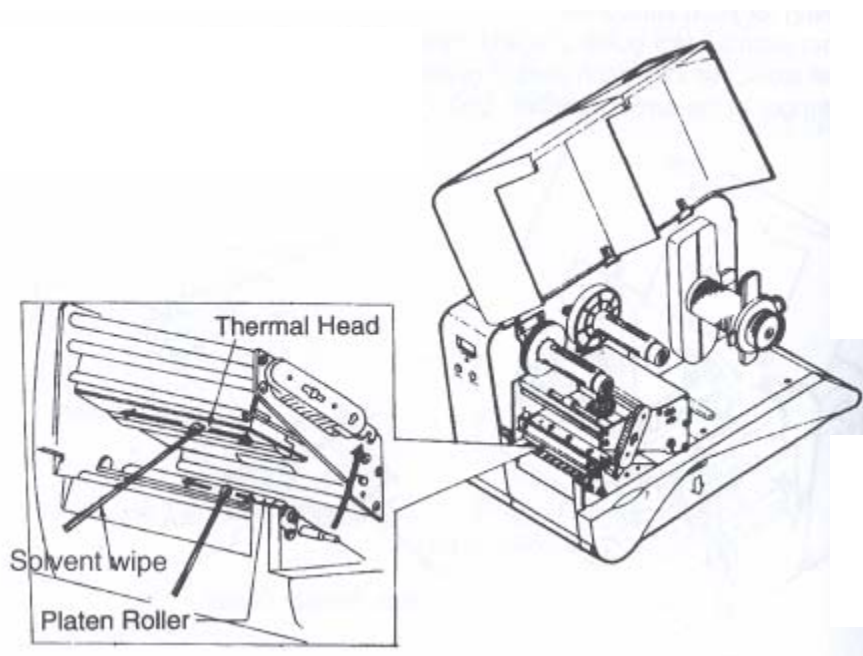
CHAPTER 7
Optional PC Card

PC Card

Printing format and graphic data can be stored on the PC card.
1M, 2M bytes TYPE II PCMCIA memory cards (JEIDA Ver4.2/PCmCIA2 equipment) are available.
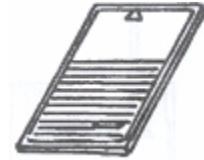
Installation
1. Power off printer and open card cover. There are 2 slots available.
2. Insert memory card into the designated slot.
3. Confirm direction of memory card before inserting into the slot. Take caution not to force the card in reverse direction as that may damage the connector of the memory card as well as the connector on the main body.
4. Confirm projection of eject button on the right hand side of the slot when memory card is inserted properly.
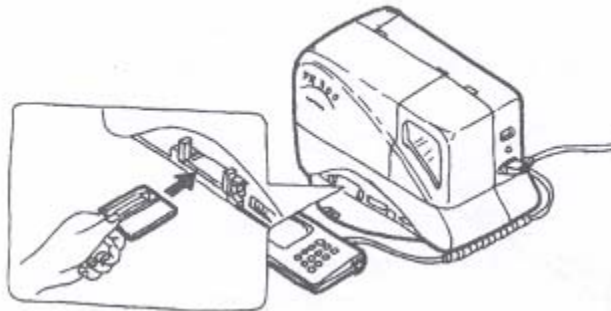
Removal:
1. Push the eject button at the right hand side of the card slot.
2. Remove the slightly ejected memory card.

⚠ Caution
1. Ensure that power is switched off when installing and removing any memory card to prevent any possible damage to the memory card, connectors and printer.
2. Close card cover to prevent intrusion of hazardous objects when no card is in the slot.
3. Please use memory card which complies with TYPE II JEIDA Ver.4.2/PCMCIA 2.1 (self-contained battery type) standard.
4. Replace memory card battery when printer prompts low battery message.

Memory Card Battery Installation / Exchange
- Confirm and identify the following.

    A. Memory Card

(Face)   <Back>
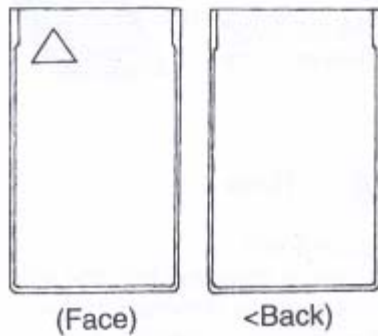
    B. Battery & Screw Driver
           Coin type lithium battery (BR2325 type) and small screwdriver
           (used for battery installation)

Battery Screw Driver
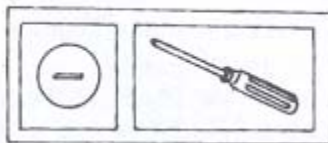
    C. Soft Case (used for carrying)
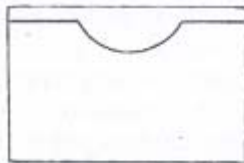
- Pull out the battery holder from memory card.

(Face)

Battery holder Screw W/P
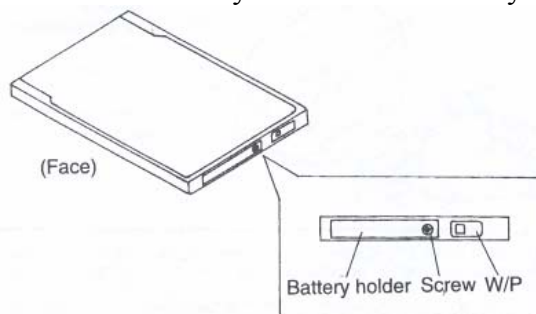
   ➢ Turn the screw anti-clockwise 2-3 times with the screwdriver and pull out the battery holder.
   ➢ The battery holder cannot be drawn completely.

- Replace battery

Set battery on the battery holder.   Push in the battery holder and lock it
                                       by turning the screw 2-3 times in
                                       clockwise direction with screw driver.

* Take caution not to touch
the battery with bare hands
to prevent poor contact.
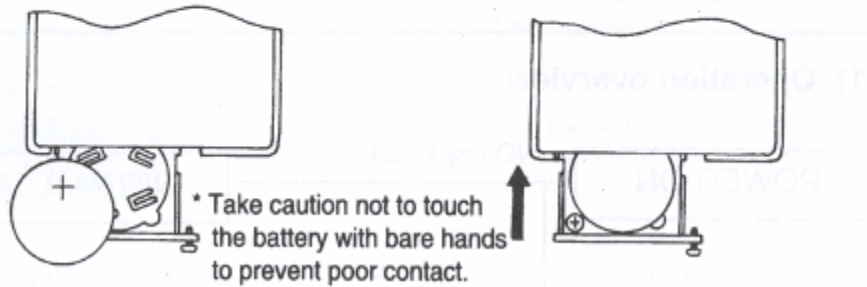
- Periodically replace the memory card battery.
- When any new memory card is used, it must be formatted.

Special Remarks:
- Ensure the battery is installed in the card to preserve stored information.
- Avoid dropping or hitting it against hard objects. Do not bend the card.
- Always keep the card dry.
- Avoid placing under direct sunlight and near heating objects.
- Keep the connector clean from dust and dirt.
- Do not touch the battery contacts with bare hands.
- Avoid high temperature and high humidity environment.
- Keep in soft case when not in use to prevent static charge.

Important!
Please read the instructions provided by manufacturer carefully.

CHAPTER 8
Operation Panel

[1] Operation Overview

POWER ON	NORMAL MODE

PUSH LINE KEY

USER MODE

PUSH FEED KEY

TEST PRINT MODE

PUSH LINE & FEED KEY

DEFAULT MODE

PUSH LINE & FEED & DSW 2-5 HEAD OPEN

FACTORY MODE

[2] Normal Mode

```
ONLINE
Q: 000000
```

LINE Key

```
OFFLINE          FEED Key          OFFLINE
      000000                             000000
```
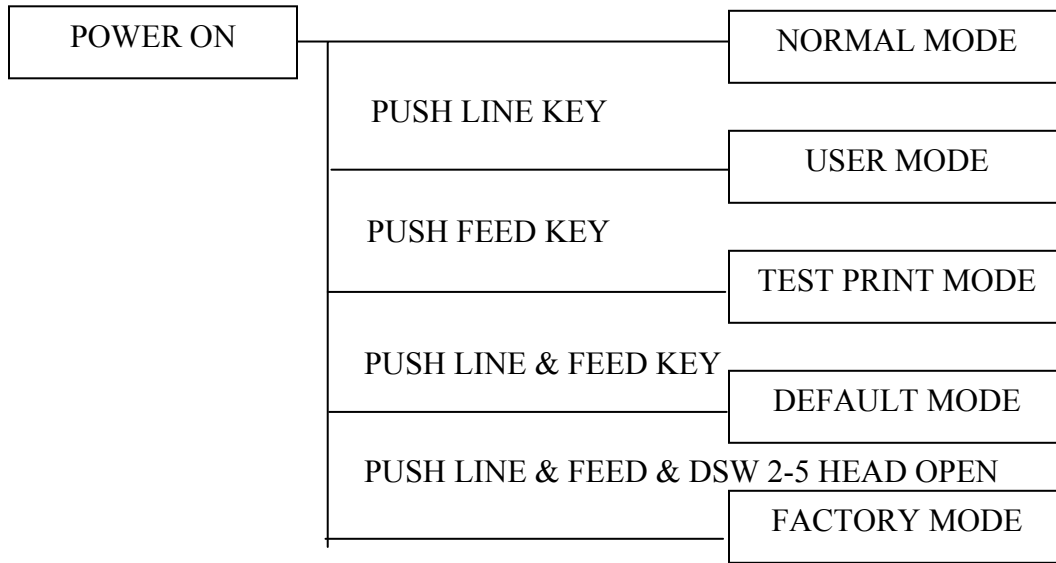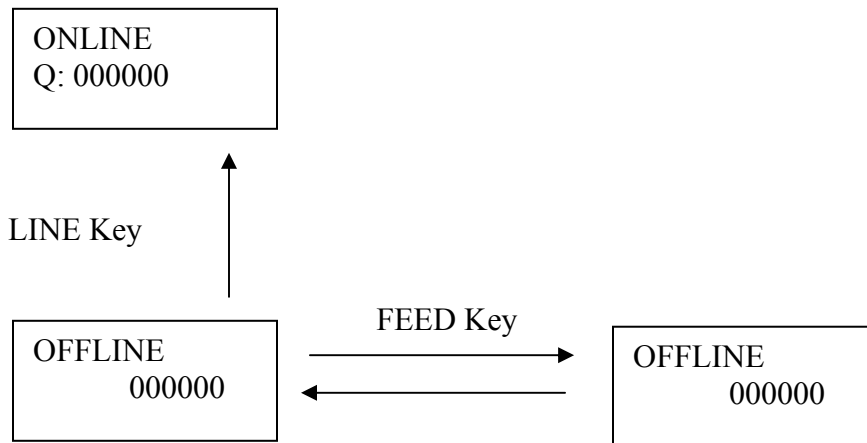
- When Touch Screen is connected, LCD display on the main body will be deactivated.

[3] User Mode

Setting of print darkness, speed, offset adjustment can be done in this mode. To enter this mode, power on printer while holding down <LINE> key.

```
┌──────────────────┐
│ USER             │
│        MODE      │
└──────────────────┘
```
Press <LINE> while power on printer, buzzer sounds and press <FEED> key to proceed to next setting.

FEED key ↓

```
┌──────────────────┐
│ DARKNESS         │
│ L 1 2 3 4 5 D    │
└──────────────────┘
```

| <LINE> key | : | cursor movement |
| <FEED key> | : | confirm darkness selection |

FEED key ↓

```
┌──────────────────┐
│ SPEED            │
│   1  2  3        │
└──────────────────┘
```

| <LINE> key | : | cursor movement |
| <FEED> key | : | confirm speed selection |

FEED key ↓

```
┌──────────────────┐
│ V. OFFSET        │
│ V : ± 0 0 0 0    │
└──────────────────┘
```

| <LINE> key | : | + or - sign selection |
| <FEED> key | : | confirm sign selection |

FEED key ↓

```
┌──────────────────┐
│ V. OFFSET        │
│ V : + 0 0 0 0    │
└──────────────────┘
```

| <LINE> key | : | increment offset value |
| <FEED> key | : | confirm vertical offset selection |

FEED key ↓

```
┌──────────────────┐
│ H. OFFSET        │
│ H : ± 0 0 0      │
└──────────────────┘
```

| <LINE> key | : | + or - sign selection |
| <FEED> key | : | confirm sign selection |

FEED key ↓

```
┌──────────────────┐
│ H. OFFSET        │
│ H : ± 0 0 0      │
└──────────────────┘
```

| <LINE> key | : | increment offset value |
| <FEED> key | : | confirm horizontal offset selection |

FEED key ↓

```
┌──────────────────┐
│ DARKNESS         │
│ L 1 2 3 4 5 D    │
└──────────────────┘
```

* Display returns to Darkness selection.

Set Value	1	2	3
DR300	75mm/s	100 mm/s	125mm/s

[4] Perform Test Printing

To enter this mode, power on printer while holding down <FEED> key.
"S" selection for this small label size paper.
Head check pattern is printed in designated paper width (4-8cm).

```
┌─────────────────────┐
│  TEST PRINT         │
│  S          L       │
└─────────────────────┘
```

FEED Key   ↓   LINE Key

```
┌─────────────────────┐
│  PR. WIDTH          │
│        04 CM        │
└─────────────────────┘
```

FEED Key   ↓

```
┌─────────────────────┐
│  TEST PRN           │
│  PRINTING           │
└─────────────────────┘
```

Press <FEED> while power on printer, buzzer
sounds and press <LINE> key to change to "S",
then press <FEED> key to confirm selection.
Confirm width of paper with <LINE> key.
(4 cm - 8 cm with step of 1 cm)
Start test printing by pressing <FEED> key.

PRINT SAMPLE
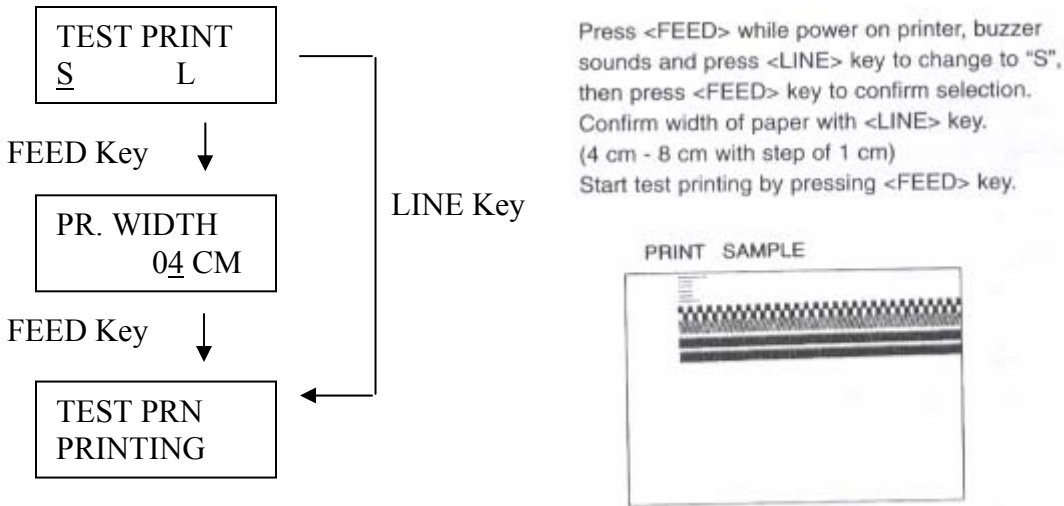
[5] "L" Selection for Large Label Size Paper

Head pattern and printer information will be printed.

```
┌─────────────────────┐
│  TEST PRN           │
│  S       L          │
└─────────────────────┘
```

FEED key   ↓

```
┌─────────────────────┐
│  TEST PRN           │
│  PRINTING           │
└─────────────────────┘
```
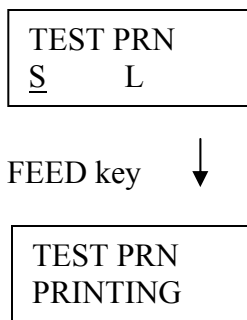
Press <FEED> while power on printer, buzzer sounds and press <LINE> key to change
to "L", then press <FEED> key to confirm selection.
Start test printing by pressing <FEED> key.

[6] Setting Default Value

```
┌─────────────────┐
│ DEFAULT         │
│ N̲O̲    YES       │
└─────────────────┘
```

↓

```
┌─────────────────┐
│ DEFAULT         │
│ COMPLETE        │
└─────────────────┘
```
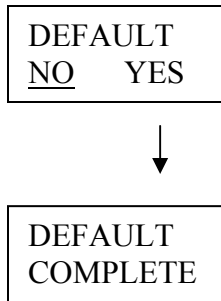
To enter this mode, power on printer while holding down <FEED> and <LINE> keys simultaneously.
Press <FEED> and <LINE> keys when power on printer, buzzer sounds, and press <LINE> key to move cursor to [YES]. Confirm by pressing <FEED> key.

[7] Setting Service Mode (Default & Service Mode)

To enter this mode, power on printer while holding down <FEED> and <LINE> keys simultaneously.

```
┌─────────────────┐
│ DEFAULT         │        Press <FEED> and <LINE> keys while power on printer,
│ N̲O̲    YES       │        buzzer sounds and press <LINE> key to move cursor to
└─────────────────┘        [NO].  Confirm by pressing <FEED> key.
```

FEED key ↓

```
┌─────────────────┐
│ SERVICE         │
│       MODE      │
└─────────────────┘
```

FEED key ↓

```
┌─────────────────┐
│ SERVICE         │    LINE key
│ LVL    SET      │
└─────────────────┘
```

Setting sensor level
<LINE> key : proceed to pitch
            adjustment setting.
<FEED> key : selection of sensor
            level and threshold
            level.

FEED key ↓

```
┌─────────────────┐
│ Tctr    [0.0v]  │
│ TH      [0.0̲v]  │
└─────────────────┘
```

↓

FEED key

```
┌─────────────────────┐
│ Tctr    [0.0v]      │
│ TH      [0.0v]      │
└─────────────────────┘
```

FEED key ↓

```
┌─────────────────────┐
│ PITCH ADJ           │
└─────────────────────┘
```

FEED key ↓   LINE key

```
┌─────────────────────┐
│ PITCH A D J         │
│ T̲ctr +00            │
└─────────────────────┘
```

FEED key ↓

```
┌─────────────────────┐
│ PITCH A D J         │
│ Tctr +̲00            │
└─────────────────────┘
```

FEED key ↓

```
┌─────────────────────┐
│ PITCH A D J         │
│ Tctr +0̲0̲            │
└─────────────────────┘
```

FEED key ↓

```
┌─────────────────────┐
│ CUT    ADJ          │
└─────────────────────┘
```
LINE key

FEED key ↓

```
┌─────────────────────┐
│ CUT    ADJ          │
│ T̲ctr +00            │
└─────────────────────┘
```

FEED key ↓

```
┌─────────────────────┐
│ CUT    ADJ          │
│ Tctr +̲00            │
└─────────────────────┘
```

↓

T̲ctr → T̲imk → T̲sde → Lgap → L̲imk → (back to T̲ctr)

Setting pitch adjustment
<LINE> key : proceed to cut
             adjustment setting
<FEED> key : selection of sensor
             and label types

** Pitch adjustment value can be
   incremented by pressing <LINE>
   key and confirm by pressing
   <FEED> key.
** All value is on 0.1V unit step.

Setting cut adjustment
<LINE> key : proceed to backfeed
             adjustment setting
<FEED> key : selection of sensor
             and label types

FEED key

```
┌─────────────┐
│ CUT   ADJ   │
│ Tctr + 0̲0̲   │
└─────────────┘
```

FEED key ↓

```
┌─────────────┐
│ BACK ADJ    │
└─────────────┘
```

FEED key ↓

```
┌─────────────┐
│ BACK   ADJ  │
│ T̲ctr +00    │
└─────────────┘
```

FEED key ↓

```
┌─────────────┐
│ BACK   ADJ  │
│ Tctr +̲00    │
└─────────────┘
```

FEED key ↓

```
┌─────────────┐
│ BACK   ADJ  │
│ Tctr +0̲0̲    │
└─────────────┘
```

FEED key ↓

```
┌─────────────┐
│ SET TIME    │
└─────────────┘
```
LINE key

FEED key ↓

```
┌─────────────┐
│ TME 0 0 : 0 0 │
│ 8 0̲ / 0 1 / 0 1 │
└─────────────┘
```

FEED key ↓

T̲ctr ⟶ T̲imk ⟶ T̲sde ⟶ L̲gap
 ↑   ↑   ↑
 └────────┴──────────────┘ L̲imk

** Cut adjustment value can be
   incremented by pressing <LINE>
   key and confirm by pressing
   <FEED> key.

Setting backfeed adjustment
<LINE> key : proceed to head
                 adjustment setting
<FEED> key : selection of sensor
                 and label types

Tctr ⟶ Timk ⟶ Tsde ⟶ Lgap ⟶ Limk
 ↑   ↓
 └──────────────────────────── None

Setting time
<LINE> key : proceed to protocode,
                 currency font setting
<FEED> key : proceed to time
                 setting display

```
┌─────────────────┐
│ TME 0 0 : 0 0   │
│ 8 0 / 0 1 / 0 1 │
└─────────────────┘
```

FEED key   ↓

```
┌─────────────────┐
│ TME 0 0 : 0 0   │
│ 8 0 / 0 1 / 0 1 │
└─────────────────┘
```

FEED key   ↓

```
┌─────────────────┐
│ TME 0 0 : 0 0   │
│ 8 0 / 0 1 / 0 1 │
└─────────────────┘
```

FEED key   ↓

```
┌─────────────────┐
│ TME 0 0 : 0 0   │
│ 8 0 / 0 1 / 0 1 │
└─────────────────┘
```

FEED key   ↓

```
┌─────────────────┐
│ SERVICE         │
│ LVL   SET       │
└─────────────────┘
```

** Time (hour, minute, second) can incremented by pressing <LINE> key and confirm by pressing <FEED> key.

[8] Setting Non-Standard Protocode

  1) Power on printer while holding down <LINE> and <FEED> keys.

```
┌─────────────────┐
│ DEFAULT         │
│ NO     YES      │
└─────────────────┘
```
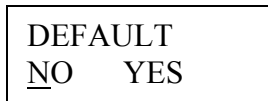
  2) Push <FEED> key 2 times and <LINE> key 5 times.

```
┌─────────────────┐
│ CODE      ADJ   │
│                 │
└─────────────────┘
```
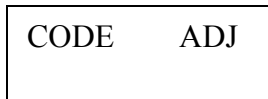
  3) It advances to non-standard code setting by pushing <FEED>. Key. STX is displayed first. The displayed data at this time becomes presently set code data. (Setting sequence is STX-ETX-ESC-ENQ-CAN)

```
┌─────────────────┐
│ CODE      ADJ   │
│ STX : 7 B       │
└─────────────────┘
```
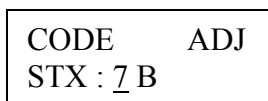
4) Count up 10 place of code with <LINE> key and set with <FEED> key.
   (With <LINE> key, +1 count up from 0 to f is displayed)

```
CODE      ADJ
STX : 7 B
```

5) Cursor moves to 1 place after set.

```
CODE      ADJ
STX : 7 B
```

6) Count up 1 place with <LINE> key and set with <FEED> key.

```
CODE      ADJ
STX : 7 B
```

7) After setting STX, advance to ETX setting. Hereafter, each code is set accordingly to the same procedures for STX setting.

```
CODE      ADJ
ETX : 7 D
```

8) Display returns to top of service mode, after setting.

```
SERVICE
LVL        SET
```

*Code data for the time of factory is default

STX : 7 b h
ETX : 7 d h
ESC : 5 e h
ENQ : 4 0 h
CAN : 2 l h

[9] Currency Font Setting

1) Power on printer while holding <FEED> and <LINE> keys.

```
DEFAULT
NO          YES
```

2) Push <FEED> key 2 times and <LINE> key 6 times.

```
PRICE       ADJ
```

3) It advances to currency font setting by pushing <FEED> key and present currency font is displayed.

```
PRICE       ADJ
DOLLAR
```

4) Switch to the desired currency font with <LINE> key and with <FEED. Key.

```
PRICE       ADJ
YEN
```

5) Display returns to top of service mode, after setting.

```
SERVICE
LVL         SET
```

Display switching sequence with <FEED> key
- Dollar
- Yen
- Saudi Riyal (LCD display is SR)
- Rupees
- Malaysia Ringgit (LCD display is RM)
- Rupiah
- Rand
- Pound
- Peso
- Baht
- None

The factory default currency font is Dollar ($).

[10] Factory Mode

```
┌─────────────────┐
│ FACTORY         │
│        MODE     │
└─────────────────┘
        │
        ▼
┌─────────────────┐
│ FACTORY         │
│ NON             │
└─────────────────┘
        │      ALL, HED, CUT
        ▼
┌─────────────────┐
│ FACTORY         │
│        PRINT    │
└─────────────────┘
```
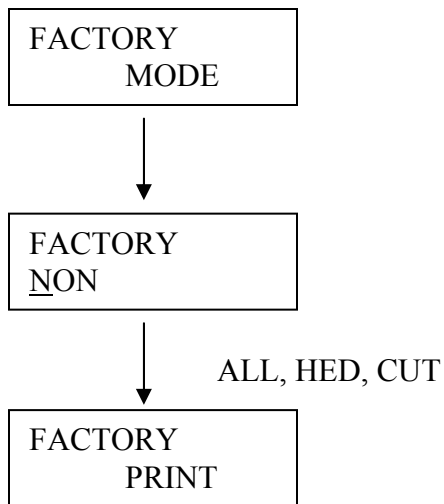
To enter this mode, set DIPSW 2-5 to ON position. Open thermal print head, power on while pressing both <FEED> and <LINE> keys. Release both keys when buzzer beeps. The LCD display will show "HEAD OPEN" message, close the thermal print head and "FACTORY MODE" will be displayed. Set DIPSW 2-5 top OFF position.

```
  ┌──────► NON ──► ALL ──► HEAD ──► CUT ──┐
  │                                        │
  └────────────────────────────────────────┘
```
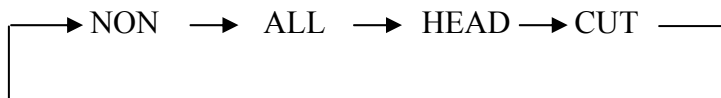
Press <LINE> key to confirm the clear item.
Press <FEED> key to print a test sample.
Press <FEED> key to stop/pause printing.

CHAPTER 9
Online Programming

COMMAND SYNTAX

```
 ┌───────────┐
 │   <D01>   │                          SAMPLE
 └───────────┘
       ↑                                   ↑
       │                                   │
    Command                     Character to be printed
```

[Command]
Above explanation means [Print characters "SAMPLE" in field 1].
Command D is not a character to be printed, but printer command code. Before transmitting "D", transmit code [ESC].
[ESC] : Designation code with hexadecimal character code (1B H). in explanation hereinafter, <D> shows transmission of 2 characters, ESC • "D".

BASIC language is utilized for explanation of program language.

Basic example of command:

10 ESC$+CHR$ (&H1B)
20 PRINT#1, ESC$; "A"
30 PRINT#1, ESC$; "M070 · · · · ·   ←——Character code (Hexadecimal 1 B H is represented by [ESC$])

[PRINT#1.] at the above example means that data is transmitted via the serial port.

COMMAND CONSTRUCTION RULE

Basic Construction Contents

Printer command is constructed in sequence such as initial designation, printing designation and end designation.

Initial designation………………………STX<A>
Field designation………………………..Designated field No. and field parameter
Printing designation…………………….Field No. and data desired to be printed
End designation…………………………<Z>ETX

Command images are as follows:

STX ⟵——————————— Initial designation

          ┌─────────────────────────┐
          │   │
          │   Command   ⟵───── │ ———————— Printing Designation
          │   │
          └─────────────────────────┘

ETX ⟵——————————— End designation
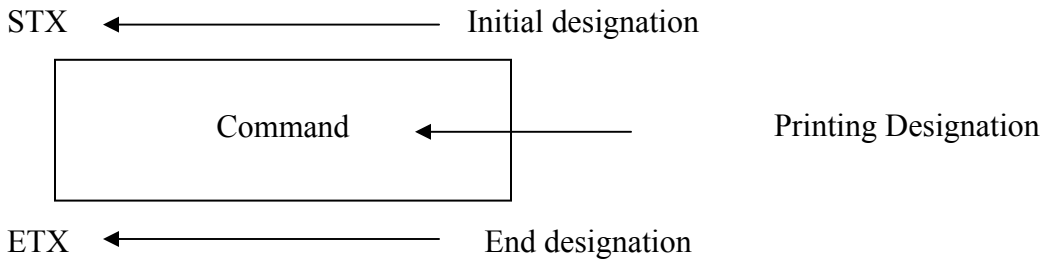
COMMAND SPECIFICATION

1) Command summary

Command	Detail	Description
<A>		Designates start of data transmission.
<M>	d d	Designates information concerning the entire printing, such as paper information, etc.
<L>	d d	Designates transmission of field parameter.
<D>	d d . .	Designates transmission of field data.
<Q>	d d d d	Designates No. of labels to be issued.
<ID>	d d	Designates printing ID (Status-3 only).
<GM>	d d	Designates graphic data (BMP).
<T1H>	d d	Custom designed character registration (16x16).
<T2H>	d d	Custom designed character registration (24x24).
<Z>		Designates end of data transmission.

2) Initial Designation Command

STX <A> [02 H, 1B H, 41 H]

Command shows start of data transmission.
Communication error and transmitted data before reception of this command will be ignored.
*For errors, like receiving uncontrollable symbol in case circuit on the host side is open/ closed, no error message will be displayed until error reception reaches 500 times.

3) End Designation Command

<Z>, ETX [1 BH, 5 AH, 03 H]
Command shows end of the data transmission.
Transmit media information, field information, print quantity, before transmitting this command.

4) Media Parameter Transmission

This command designates paper size, base reference position, sensor type, etc. <M>
[1BH, 4DH]   n n n…..

ESC	M	Size Designation			Base reference position designation			Paper Information			Vertical position adjustment			Horizontal position adjustment			EJECT	Copy Image designation			Rotate Print designation		
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23

Digit Position	Item	Data	Description
1 – 3	Size designation	nnn	Designates paper size for printing with mm unit.
4	Base reference position (Direction)	n	Shows moving direction of base position for print and cut. 1 : + towards feeding direction 0 : - towards feeding direction
5 – 7	Base reference position designation (Movement)	nnn	Designates movement of base position for print and cut in dot unit.
8	Paper Information (Kind of paper)	n	Label = 0, Tag = 1
9	Paper Information (Sensor)	n	Centre hole = 1 I-mark = 2 } Designates paper identifying Gap = 3 } sensor Side hole = 4 }
10	Paper Information (Cut function)	n	Cut function OFF = 0, ON = 1
11	Vertical position Adjustment (Direction)	+ , -	From top of print, DOWN = +, UP = -
12 , 13	Vertical position Adjustment (Movement)	nn	Value in dot unit
14	Horizontal position Adjustment (Direction)	+ , -	From top of print, RIGHT = +, LEFT = -
15 , 16	Horizontal position Adjustment (Movement)	nn	Value in dot unit
17	Eject Cut	n	Eject function, OFF = 0, ON = 1
18	Image Copy (ON/OFF)	n	Image print OFF = 0, ON = 1
19 , 20	Image Copy (Movement)	nn	Designates sideway movement in mm unit
21	Rotate print (ON/OFF)	n	Rotate print OFF = 0, ON = 1
22 , 23	Rotate print (Paper Width)	nn	Designates width of paper used in mm unit.

5) Field Parameter Transmission

This command designates print data information, for example, field type, printing position, and other information.

Maximum of 50 fields are allowed in one format.

<L> [1Bh, 4Ch] D D n n n ……

ESC	L	Field No	Field designation		Print designation				Input check designation				Sequential No. designation (can be omitted if not used)						
		N N	1	2	3			17	18			22	23						47

Field designation can be utilized with on-line.

Field Designation		Font available
1	2	3
1. Text	0 : Standard font	0 : U, 1 : S, 2 : M, 3 : OCR-B, 6 : WB, 7 : WL, 8 : custom-designed 1, 9 : custom-designed 2 (24 x 24)
	2 : True Type	0 – 9 (store number)
3. Calendar	0 : date (standard font) 1 : time (standard font)	0 : U, 1 : S, 2 : M
	2 : date (True Type) 3 : time (True Type)	0 – 9 (store number)
4. 2D Bar Code	0 : PDF417 1 : Datacode 2 : Vericode 3 : QR Code 4 : MAXI	0 Mode 0 0 0
7. Barcode	0 : no interpretation 1 : with interpretation 2 : no interpretation with guide bar 3 : interpretation with guide bar	0 : NW-7, 1 : CODE39, 2 : INT 2 of 5 3 : EAN13, 4 : EAN8, 5 : UPC-E 6 : CODE128B, 7 : CODE128C 8 : UCC/EAN128 9 : BOOKLAND*1
8. Box/graphic/reverse	0	0 : box
		1 : graphic
		2 : reverse
0 : function field	0	0 : print quantity

- If the 2nd digit position is [0], the item cannot be edited.
- *1 :   2 fields will be used for printing "bookland" barcode.
          1 field at [EAN13], another field at [bookland]

Following functions cannot be utilized with on-line.

Item No.	Function Name	Countermeasure
1	Price field	Use normal alphanumeric data field.
2	C/D calculation	C/D should be attached on host side.
3	Copy function	Character data process on host side.
4	Input check	No error check for receiving data. Host side to verify all data.

6) On-line Mode Field Parameter Summary

Field Designation		Print Setting							
1	2	3	4 ~ 7	8 ~ 10	11	12 ~ 13	14 ~ 15	16	17
Text	AN Font	Font Type 0 : U 1 : S 2 : M 3 : OCR-A 4 : OCR-B 6 : WB 7 : WL 8 : CDC 1 9 : CDC 2	Vertical Position 0001 ~ 1424	Horizontal Position 001 ~ 640	Rotation 0 ~ 3	Character Gap 00 ~ 99	Character Count 1 ~ 40	Vertical Character Expansion 1 ~ 9	Horizontal Character Expansion 1 ~ 9
	True Type 2	0 - 9 store number	Do	Do	Do	Do	Do	Do	Do
Calendar 3 (standard font)	Date 0	Font Type 0 : U 1 : S 2 : M	Do	Do	Do	Do	Do	Do	Do
	Time 1	Do	Do	Do	Do	Do	Do	Do	Do
Calendar 3 (True Type)	Date 2	0 - 9 store number							
	Time 3	Do	Do	Do	Do	Do	Do	Do	Do
2D Bar Code 4	PDF417	0	Do	Do	Do	Vertical Module Count	Horizontal Module Count	Error Correction	1 Line Data Digit Count
	1: DataCode	Mode				Cell Size	0 0	Error Correction	Error Correction
	2: VeriCode	0				Cell Size	0 0	Error Correction	Size
	3: QR Code	0				0 0	0 0	0 0	0
	4: MAXI	0				0 0	0 0	0 0	0

Bar Code 7	No barcode interpretation (no EAN guide bar) 0	Barcode Type 0 : NW-7 1 : CODE39 2 : INT2OF5 3 : EAN13 4 : EAN8 5 : UPC-E 6 : CODE128B 7 : CODE128C 8 : UCC/E128 9 : BOOKLAND	Do	Do	Do	0 0	Do	Barcode ratio 0 : none 1 1:2 2 2:5 3 1:3 4 flexible 5 NW7 6 SATOC NW7	Barcode extension 1 ~ 9
	Barcode interpretation (no EAN guide bar) 1	Do	Do	Do	Do	Barcode interpretation character gap 00 ~ 99	Do	Do	Do
	No barcode interpretation (w/EAN guide bar) 2	Do	Do	Do	Do	Do	Do	Do	Do
	Barcode interpretation (w/EAN guide bar) 3	Do	Do	Do	Do	Barcode interpretation character gap 00 ~ 99	Do	Do	Do

1	2	3	4 ~ 7	8 ~ 10	11 ~ 14	15 ~ 17
Box/Line Graphic Reverse 8	0	Line/Box 0	Vertical position 0001 ~ 1424	Horizontal line length 001 ~ 640	Vertical line length 0001 ~ 1424	Horizontal line length 001 ~ 640
	0	Graphic 1	Do	Do	0001	001
	0	Reverse 2	Do	Do	Vertical line length 0001 ~ 1424	Horizontal line length 001 ~ 640

Input Verification				Sequential Setting					
18	19	20	21	22 23 ~ 24	25 ~ 26	27 ~ 29	30 ~ 31	32 ~ 39	40 ~ 47
Input Verification 1 0	Input Verification 0	Bold Font 0 : none 1 : right 2 : lower 3 : lower & rught	0 insertion 0	Start position	Digits	Sequential Value	Repeat same number	Minimum Value	Maximum Value
0 0	0 0	0 0	Do 0	Do 0 0	Do 0	Do 0	Do 0	Do 0	Do 0
Addition/real time 0 : No addition 1 : Addition 2 : No addition/real 3 : Addition/real	Do	Date format 0 : DDMMYY 1 : MMDDYY 2 : DDMMYYYY 3 : MMDDYYYY	Zero insertion 0 : None 1 : Zero insertion		0	0	0	0	0
Do	Do	Do	Do	0 0	0	0	0	0	0
Do	Do	Time Field 0 : 24H 1 : AM/PM00H 2 : AM/PM12H	Do	0 0	0	0	0	0	0
Do	Do	Do	Do	0 0	0	0	0	0	0
1 Line Data Digit Count 0 Matrix Size 0 0	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0 0 0 0 0 0	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0
Barcode height 1 ~ 600			0	Sequential Setting Number Start Line	Sequential Number Digit	Increment Decrement	Repeat same number	Minimum Value	Maximum Value
Do Do Do			Do Do Do	Do Do Do	Do Do Do	Do Do Do	Do Do Do	Do Do Do	Do Do Do
Line Width 2 ~ 9 (Vertical)	Horizontal width 2 ~ 9	0	0	0 0	0	0	0	0	0
Number input 0 : none 1 : set	0	0	0	0 0	0	0	0	0	0
0	0	0	0	0 0	0	0	0	0	0

0" is item unable to set.

*Sequential No. designation parameter (23~47) must be transmitted, when 1 or 2 is designated at sequential No. designation (22).

Transmission is not needed when sequential No. designation (22) is 0.

7) Field data transmission

Designates printing data of the field.
Field data can be designated up to a maximum of 50 fields.

<D> [1 Bh, 44h] DD nnn…..

E S C	D	Field No.	Printing data (Unused place can be omitted)																
		N	N	1	2	3													40

Special remark on field data transmission.

I. Bar code with start/stop code (NW-7, CODE 39)
For NW-7, CODE39 barcode, set [Data digits number] excluding start/stop field in parameter setting.
Transmit additional 2 data as shown when using online.


```
NW-7       A d d d d d B   ┐ Set digit number of field parameter
CODE 39    * d d d d d *   ┘ Transmission data as printing data
```

II. CODE 128, UCC/EAN 128 bar code.

These are barcodes of similar symbology, but are classified as different bar code types due to there are symbols that cannot be input manually. In online printing, CODE128A set (not available in stand alone) can be utilized in data transmission including start symbol and function symbol.
Remarks on CODE128:
1: Designate CODE 128 B set for field parameter.
2: Refer to appendix on data character for CODE128.
3: Maximum data is 40 digits/field.
4: Start code cannot be omitted.
5: Stop code, Modulus 103C/D are automatically added.

III. Calendar field

Date, time printing field utilizes printer internal calendar. As a result, transmission of printing data is not necessary. In utilization of adding function for date and time, transmit data with date addition (3 digits) and time addition (2 digits).

8) Graphic data transmission

Transmit graphics data directly to graphic field.
*1: When transmitting graphic data to printer, sequential numbering function of printer cannot be utilized.
*2: Graphic can be stores in PC card using <D> command to indicate the register number (3 digits). Stored graphic can be retrieved.
*3: Each graphic size must not exceed 26 kilobytes.

<GM> [1Bh, 47h, 4Dh] NN DDDDD, nnn……

E S C	D	Field		Graphic					Separator	BMP data										
		N	N	D	D	D	D	D	,											

9) Data ID transmission

This command registers ID information in status-3 communication mode. If omitted when transmitting, the returned status will be blank.

<ID> [1Bh, 49h, 44 h] NN

E S C	ID	ID NO.	
		N	N

10)   Normal, calendar, true type field
  ➢ Print designation
    1 Normal, alphanumeric character
    2 Calendar date
    3 Calendar time

Digit Position	Designated Item	Designated Description
1, 2	Field Designation	10 : Normal, alphanumeric character 12 : True Type 30 : Calendar Date 31 : Calendar Time 32 : Date (True Type) 33 : Time (True Type)
3	Font Type	0 : U Font (W 5 x P 9 dots) 1 : S Font (W 17 x P 17 dots) 2 : M Font (W 24 x P 24 dots) 3 : OCR-A Font (W 15 x P 22 dots) 4 : OCR-B Font (W 20 x P 24 dots) 6 : WB (W 48 x P 48 dots) 7 : WL (W 48 x P 48 dots) 8 : Custom Designed Character 1 (W16 x 16 dots) 9 : Custom Designed Character 2 (W24 x 24 dots)
	True Type	0-9 : (store number of True Type)
4, 5 6,7	Vertical Position	0000 : Input only and no printing field 0001 ~ 1424 : Vertical position (dot)
8, 9 10	Horizontal Position	Horizontal Position (dot)
11	Rotation	0 : 0 degree 1 : 90 degree 2 : 180 degree 3 : 270 degree
12, 13	Character Gap	00~99 : character gap (dot)
14, 15	Data digits	01~40 : data digits
16	Vertical expansion	1~9 : character vertical expansion
17	Horizontal expansion	1~9 : character horizontal expansion

> ➢ Input check designation (Normal)
>   1 Normal, alphanumeric character

Digit Position	Designated Item	Designated Description
18	Input check 1	0 : when online mode
19	Input check 2	0 : when online mode
20	Bold Font	0 : None 1 : Right 2 : Lower 3 : Right & Lower
21	Reserved	0

> ➢ Sequential numbering
>   1 Normal, alphanumeric character

Digit Position	Designated Item	Designated Description
22	Sequential function	0 : No 1 : Increment 2 : Decrement
23, 24	Start Position	01~40 : starting position
25, 26	Data Count	01~08 : data count
27, 28, 29	Step (increase, decrease)	001~999 ; sequential step
30, 31	Repeat quantity	01~99 : same number repeat quantity
32-39	Minimum data range	00000001~99999999 : For incremental numbering, the wrap around value when it reaches the maximum value. For decrement numbering, the minimum value.
40-47	Maximum data range	00000001~99999999 For incremental numbering, the maximum value. For decrement numbering, the wrap around value when it reaches the minimum value.

* Sequential numbering is for numeric data only.

> ➤ Calendar field

Calendar field :
1. Calendar : date [30]
2. Calendar : time [31]
3. True Type : date [32]
4. True Type : time [33]

Digit Position	Designated Item	Designated Description
18	Addition	0 : None 1 : Yes
19	Input check 2	0
20	Calendar format	Date field 0 : DD. MM. YY 1 : MM. DD. YY 2 : DD. MM. YYYY 3 : MM. DD. YYYY Time field 0 : 23 : 08 1 : PM 00 : 08 (For PM 00 :00) 2 : PM 12 : 08 (For PM 12 : 00)
21	0 Suppress	0 : Remove leading 0 (01 hour -> 1 hour) 1 : No suppress

> ➤ True Type

Digit Position	Designated Item	Designated Description
18	Addition	0
19	Input check 2	0
20	Calendar format	0

11)   Bar Code Field

1 : Bar code designation
- Bar code without human interpretation character.
- Bar code with human interpretation character.

Digit Position	Designated Item	Designated Description
1, 2	Field designation	70 : Bar code without interpretation (w/o EAN Guide Bar) 71 : Bar code with interpretation (w/o EAN Guide Bar) 72 : Bar code without interpretation (w/EAN Guide Bar) 73 : Bar code with interpretation (w/EAN Guide Bar)
3	Bar code type	0 : NW-7 (Bar ratio selection YES) 1 : CODE 39 (Bar ration selection YES) 2 : INT 2 of 5 (Bar ratio selection YES) 3 : EAN 13 / UPC-A 4 : EAN 8 5 : UPC-E 6 : CODE 128 (B set without control code character) 7 : CODE 128 (C set without control code character) 8 : UCC/EAN 128 9 : BOOKLAND
4, 5 6, 7	Vertical Position	0000 : Input only and no printing field 001 ~ 1424 : Vertical position (dot)
8-10	Horizontal Position	001 ~ 640 : Horizontal position (dot)
11	Rotation	0 : 0 degree 1 : 90 degree 2 : 180 degree 3 : 270 degree
12, 13	Character gap	00-99 : Character gap (dot) (For human interpretation character)
14, 15	Data digits	01~40 : Data digits *Exclude start/stop code for NW-7, Code 39 *01-20 for Code 128
16	Bar ratio	0 : None (For EAN, etc) 1 : 1:2 2 : 2:5 3 : 1:3 4 : Flexible bar ratio (1 field/format) 5 : Simplified NW-7 (For NW-7 only) 6 : SATOC NW-7 (NW-7 only)
17	Horizontal expansion	1~9 : Bar code horizontal expansion

2 : Input Check Designation (Bar Code)
- Bar code without human interpretation character.
- Bar code with human interpretation character,

Digit Position	Designated Item	Designated Description
18, 19, 20	Bar code height	001~600 : bar code height (dot)
21	Reserved	0
22	Sequential function	0 : No 1 : Increment 2 : Decrement
23, 24	Start Position	01~40 : Starting Position
25, 26	Data Count	01~08 : data count
27, 28, 29	Step (increase, decrease)	001~999 : sequential step
30, 31	Repeat quantity	01~99 : same number repeat quantity
32-39	Minimum data range	00000001 ~ 99999999 For incremental numbering, the wrap around value when it reaches the maximum value. For decrement numbering, the minimum value.
40-47	Maximum data range	00000001 ~ 99999999 For incremental numbering, the maximum value. For decrement numbering, the wrap around value when it reaches the minimum value.

*Sequential numbering is for numeric data only.

12)   Line / Box Field Transmission

Digit Position	Designated Item	Designated Description
1, 2	Field designation	80 : Line /Box, Graphic, Reverse
3	Font Type	0 : Line / Box
4~7	Vertical Position	0001~1424 : Vertical position (dot)
8~10	Horizontal Position	001~640 : Horizontal position (dot)
11~14	Vertical Line Length	0001~1424 : Vertical line length (dot)
15~17	Horizontal Line Length	001~640 : Horizontal line length (dot)
18	Horizontal Width	1-9 : Horizontal line thickness (dot)
19	Vertical Width	1-9 : Vertical line thickness (dot)
20~47	Reserved	0 : Reserved

13)   Graphic Field Transmission

Digit Position	Designated Item	Designated Description
1, 2	Field Designation	80 : Line/Box, Graphic, Reverse
3	Font Type	1 : Graphic
4~7	Vertical Position	0001~1424 : Vertical position (dot)
8~10	Horizontal Position	001~640 : Horizontal position (dot)
11~14	Graphic Length Size	0001 : Reserved
15~17	Graphic Width Size	0001 : Reserved
18~47	Reserved	0 : Reserved

14)   Reverse Field Transmission

Digit Position	Designated Item	Designated Description
1, 2	Field Designation	80 : Line/Box, Graphic, Reverse
3	Font Type	2 : Reverse
4~7	Vertical Position	0001~1424 : Reverse start vertical position (dot)
8~10	Horizontal Position	001~640 : Reverse start horizontal position (dot)
11~14	Vertical Size	0001~1424 : Reverse vertical size (dot)
15~17	Horizontal Size	001~640 : Reverse horizontal size (dot)
18~47	Reserved	0 : Reserved

15)   Custom-Designed Character Registration Transmission

This command registers user design character patterns in printer memory.
There are 2 types of Custom Design Character:

1 : 16x16 Dots

<T1> [1Bh, 54h, 31h, 48h] NN DDD . . . DDD

Where NN   : 21~52
        DDD   : 64 bytes

E S C	T1H	NO.		Data											
		N	N	D	D	D	D	•	•	•	•	•	•	D	D

2 : 24x24 Dots

<T1> [1Bh, 54h, 31h, 48h] NN DDD . . . DDD

Where NN   : 21~52
        DDD   : 144bytes

E S C	T2H	NO.		Data											
		N	N	D	D	D	D	•	•	•	•	•	•	D	D

2D Bar Code Field Designation

Digit Position	Designated Item	Designated Description	
1	Field Designation	4 : 2D Bar Code	
2	Field Description	0 : PDF417 1 : Data Code 2 : VeriCode 3 : QR Code 4 : Maxi Code	
3	Mode	PDF417	0 : Fixed
		Data Code	1 ~ 6 : Mode
		VeriCode	0 : [0] Fixed
		QR Code	0 : [0] Fixed
		Maxi Code	0 : [0] Fixed
4, 5 6, 7	Vertical Position	0000: Input only and no printing field 0001 ~ 2848: Vertical position (dot)	
8, 9, 10	Horizontal Position	001 ~ 640: Horizontal position (dot)	
11	Rotation	0 : 0º 1 : 90º 2 : 180º 3 : 270º	
12, 13	Module Vertical Dot Count	PDF417	01 ~ 24 : Minimum module for vertical dot
		Data Code	01 ~ 32 : Cell size
		VeriCode	03 ~ 10 : Cell size
		QR Code	00
		Maxi Code	00
14, 15	Module Horizontal Dot Count	PDF417	01 ~ 09 : Minimum module for horizontal dot
		Data Code	00
		VeriCode	00
		QR Code	00
		Maxi Code	00
16, 17, 18	Error Correction OR Data Digit	PDF417	16 : Error Correction 17, 18 : 1 line data digit count
		Data Code	16, 17 : Error Correction 18 : 0
		VeriCode	16 : Error Correction 17, 18 : Matrix Size
		QR Code	0
		Maxi Code	0
19	Reserved	All [0]	

1) 2D Bar Code is only applicable for online printing.
2) The maximum data digit varies for different 2D barcode.

PDF417 Code

Digit Position	Designated Item	Designated Description
1	Field Designation	4 : 2D Bar Code
2	Field Designation	0 : PDF417
3	Mode	0 : [0] Fixed
4, 5 6, 7	Vertical Position	0000 : Input only and no printing field 0001 ~ 2848 : Vertical position (dot)
8, 9 10	Horizontal Position	001 ~ 640 : Horizontal position (dot)
11	Rotation	0 : 0º 1 : 90º 2 : 180º 3 : 270º
12, 13	Module Vertical Dot Count	01 ~ 24 : Minimum module for vertical dot (*refer to module size notes)
14, 15	Module Horizontal Dot Count	01 ~ 09 : Minimum module for horizontal dot (*refer to module size notes)
16	Error Correction	0 ~ 8 : Security Level
17, 18	1 Line Data Digit Count	00 ~ 03
19 ~	Reserved	All [0]

* Module
To define the dot size:
1. Recommended to specify the vertical to horizontal dot ratio of 1:3 for better readability by the scanner.
2. It is possible to define vertical dot (01, 02, 03), horizontal dot (01, 02, 03) but there might be difficulties decoding fields.
3. Use the larger module for better printing quality.

Error Correction
To define the corrective level when bar code is damaged or tampered.
1. Higher corrective level provides better correction and reading.
2. Higher corrective level will increase barcode size.

Data Code

Digit Position	Designated Item	Designated Description
1	Field Designation	4 : 2D Bar Code
2	Field Designation	1 : Data Code
3	Mode (Format ID)	1 : Numeric Mode 2 : Alpha (upper case mode) 3 : Alphanumeric & Notation 4 : Alphanumeric 5 : 7-bit data 8-bit data mode (*refer to code table)
4, 5 6, 7	Vertical Position	0000: Input only and no printing field 0001 ~ 2848: Vertical position (dot)
8, 9 10	Horizontal Position	001 ~ 640: Horizontal position (dot)
11	Rotation	0 : 0º 1 : 90º 2 : 180º 3 : 270º
12, 13	Module	01 ~ 32 : Cell Size (dot) (refer to module size notes)
14, 15	Reserved	00
16, 17	Error Correction	Error Correction Level 00 : ECC000, 05 : ECC050, 08 : ECC080 10 : ECC100, 14 : ECC140, 20 : ECC200
18	Reserved	[0] Fixed
19 ~	Reserved	All [0]

* <u>Module</u>
To define the cell size:
1. The definition of 01, 02 dots are acceptable but may face difficulties for decoding/reading.
2. Use larger module for better printing quality.

<u>Error Correction</u>
To define the error correction level when barcode is damaged or tampered. Connection level is high with larger correction definition.

VeriCode

Digit Position	Designated Item	Designated Description
1	Field Designation	4 : 2D Bar Code
2	Field Designation	2 : VeriCode
3	Mode	0 : [0] Fixed
4, 5 6, 7	Vertical Position	0000 : Input only and no printing field 0001 ~ 2848 : Vertical position (dot)
8, 9 10	Horizontal Position	001 ~ 640 : Horizontal position (dot)
11	Rotation	0 : 0º 1 : 90º 2 : 180º 3 : 270º
12, 13	Module Vertical Dot Count	03 ~ 10 : Cell Size (dot) (refer to module size notes)
14, 15	Reserved	[0 0] Fixed
16	Error Correction	2, 4 : Error Correction Level
17, 18	Matrix Size	01 ~ 20 : Matrix Size (input data count)
19 ~	Reserved	All [0]

* Module
Define the cell size:
1. The definitions of 01, 02 are acceptable but may be difficult to read/decode.
2. Use larger module for better printing quality.

Error Correction and Data

Maximum data count depends in the definition of error correction and matrix size.

1. Error Correction Level
   Error Correction Level and User Data Ratio/Correction capabilities relations table:

Correction Level	User Data Ratio	Correction Capability (%)
2	75%	12.5%
4	50%	25.0%

2. Matrix Size
    Defining the barcode size. Below table shows the barcode size and maximum data count allowable.

Definition	Matrix Size	Input Data Size	
		Correction level = 2	**Correction level = 4**
01	10 x 10	4	2
02	12 x 12	5	2
03	14 x 14	10	6
04	16 x 16	16	10
05	18 x 18	22	14
06	20 x 20	28	18
07	22 x 22	34	22
08	24 x 24	42	26
09	26 x 26	52	34
10	28 x 28	60	38
11	30 x 30	70	46
12	32 x 32	82	54
13	34 x 34	94	62
14	36 x 36	106	70
15	38 x 38	118	78
16	40 x 40	132	86
17	42 x 42	148	98
18	44 x 44	162	106
19	46 x 46	178	118
20	48 x 48	196	130

QR Code

Digit Position	Designated Item	Designated Description
1	Field Designation	4 : 2D Bar Code
2	Field Designation	3 : QR Code
3	Mode	0 : [0] Fixed
4, 5 6, 7	Vertical Position	0000 : Input only and no printing field 0001 ~ 2848 : Vertical position (dot)
8, 9 10	Horizontal Position	001 ~ 640 : Horizontal position 9dot)
11	Rotation	0 : 0º 1 : 90º 2 : 180º 3 : 270º
12, 13	Module Size	[00] Fixed
14, 15	Reserved	[00] Fixed
16	Error Correction	Error Correction Level [00] Fixed
17, 18	Reserved	[00] Fixed
19 ~	Reserved	All [0]

Module
To define the cell size:
1. The definition of 01, 02 dots are acceptable but may face difficulties to decode/read.
2. Use the larger module for better printing quality.

Error Correction
To define the error correction level when barcode is damaged or tampered. Connection level is high with larger correction definition.

Maxi Code

Digit Position	Designated Item	Designated Description
1	Fixed Designation	4 : 2D Bar Code
2	Fixed Designation	4 : Maxi Code
3	Mode	0 : [0] Fixed
4, 5 6, 7	Vertical Position	0000 : Input only and no printing field 0001 ~ 2848 : Vertical position (dot)
8, 9 10	Horizontal Position	001 ~ 640 : Horizontal position (dot)
11	Rotation	0 : 0º 1 : 90º 2 : 180º 3 : 270º
12, 13	Reserved	[00] Fixed
14, 15	Reserved	[00] Fixed
16	Reserved	[00] Fixed
17, 18	Reserved	[00] Fixed
19 ~	Reserved	All [0]

Module Size
Use larger module size for better printing quality.

Error Correction
To define the error correction level when barcode is damaged or tampered. Connection level is high with larger correction definition.

2D Bar Code Command

2D barcode is only valid for Online mode. When setting data for PDF417, VeriCode, DataCode. Use:

                       \<BA> if data contains control code.

                       \<BB> if data doesn't contain control code.

\<BB> command syntax contains data byte count to prevent the printer from misinterpretation of the 2D barcode data.

\<BA> field number data
\<BB> field number data count, data

Use: \<BQ> command for QR code
        \<BQ> Field number QR parameter QR data

2D Bar Code Type and Command Table

Bar Code Type	Data Command	Maximum Data Count
PDF417	\<BB>	2681 bytes
VeriCode	\<BA>	196 bytes
Data Code	\<BA>	500 bytes
Maxi Code	\<BA>	93 bytes
QR Code	\<BQ>	7089 bytes

QR Code Command

QR Code <BQ>
1. Command Syntax
ESC + BQ + NN+ a b c c (, d d e e f f) , g n n n • • n, g h h h h n n n • • n
$<1B>_{16}$ $<42>_{16}$ $<51>_{16}$ N N a b c c (, d d e e f f) , g n n n • • n, g h h h h n n n • • n

2. Description

Parameter
     a   "Error correction level (error correction)"
           1: 70% (L)
           2: 15% (M)
           3: 30% (Q)
           4: 25% (H)
     b   "Concatenation Mode"
           0: Regular Mode
           1: Concatenated Mode
     c   "Cell edge size specification Valid Range: 01-32
           ex) cc = 04

4 dot
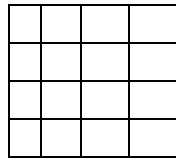
4 dot   Feed direction

     d   "Split Number of Concatenation Mode"   Valid Range: 01-16
         * A split number is a specification on how many split 2D codes (QR code)
           are concatenated using the Concatenation Mode.
     e   "Sequential Number split with the Concatenation Mode"
           Valid Range: 01-16
         * The sequential number is the order of the split 2D code (QR code).
     f   "Concatenation Mode Parity Data"   Valid Range: 00-FF
         * The parity data is the data specified by the hex character which is
           calculated from all print data of the split 2D code (QR code) by XOR.
     g   "Character Mode"
           1: Numeric Mode
           2: Alphanumeric Mode
           3: Binary Mode
           4: Kanji Mode (SJIS)
           0: Auto Setting
     h   "Data Number"   Valid Range: 0001-2953
     n   "Print Data"

QR Data Size Table (Model - 2)

Version	Error Correction	Numeric	Alphanumeric	Kanji	Binary
1	L	41	25	10	17
	M	34	20	8	14
	Q	27	16	7	11
	H	17	10	4	7
2	L	77	47	20	32
	M	63	38	16	26
	Q	48	29	12	20
	H	34	20	8	14
3	L	127	77	32	53
	M	101	61	26	42
	Q	77	47	20	32
	H	58	35	15	24
4	L	187	114	48	78
	M	149	90	38	62
	Q	111	67	28	46
	H	82	50	21	34
5	L	255	154	65	106
	M	202	122	52	84
	Q	144	87	37	60
	H	106	64	27	44
6	L	322	195	82	134
	M	255	154	65	106
	Q	178	108	45	74
	H	139	84	36	58
7	L	370	224	95	154
	M	293	178	75	122
	Q	207	125	53	86
	H	154	93	39	64
8	L	461	279	118	192
	M	365	221	93	152
	Q	259	157	66	108
	H	202	122	52	84
9	L	552	335	141	230
	M	432	262	111	180
	Q	312	189	80	130
	H	235	143	60	98
10	L	652	395	167	271
	M	513	311	131	213
	Q	364	221	93	151
	H	288	174	74	119

Version	Error Correction	Numeric	Alphanumeric	Kanji	Binary
11	L	772	468	198	321
	M	604	366	155	251
	Q	427	259	109	177
	H	331	200	85	137
12	L	833	535	226	367
	M	691	419	177	287
	Q	489	296	125	203
	H	374	227	96	155
13	L	1022	619	262	425
	M	796	483	204	331
	Q	580	352	149	241
	H	427	259	109	177
14	L	1101	667	282	458
	M	871	528	223	362
	Q	621	376	159	258
	H	468	283	120	194
15	L	1250	758	320	520
	M	991	600	254	412
	Q	703	426	180	292
	H	530	321	136	220
16	L	1408	854	361	586
	M	1082	656	277	450
	Q	775	470	198	322
	H	602	365	154	250
17	L	1548	938	397	644
	M	1212	734	310	504
	Q	876	531	224	364
	H	574	408	173	280
18	L	1725	1046	442	718
	M	1346	813	345	560
	Q	948	574	243	394
	H	746	452	191	610
19	L	1903	1153	488	792
	M	1500	909	384	624
	Q	1063	644	272	442
	H	813	493	208	338
20	L	2061	1249	528	858
	M	1600	970	410	666
	Q	1159	702	297	482
	H	919	557	235	382

Version	Error Correction	Numeric	Alphanumeric	Kanji	Binary
21	L	2232	1352	572	929
	M	1708	1035	438	711
	Q	1224	742	314	509
	H	969	587	248	403
22	L	2409	1460	618	1003
	M	1872	1134	480	779
	Q	1358	823	348	565
	H	1056	640	270	439
23	L	2620	1588	672	1091
	M	2059	1248	528	857
	Q	1468	890	376	611
	H	1108	672	284	461
24	L	2812	1704	721	1171
	M	2188	1326	561	911
	Q	1588	963	407	661
	H	1228	744	315	511
25	L	3057	1853	784	1273
	M	2395	1451	614	997
	Q	1718	1041	440	715
	H	1286	779	330	535
26	L	3283	1990	842	1367
	M	2544	1542	652	1059
	Q	1804	1094	462	751
	H	1425	864	365	593
27	L	3517	2132	902	1465
	M	2701	1637	692	1125
	Q	1933	1172	496	805
	H	1501	910	385	625
28	L	3669	2223	940	1528
	M	2857	1732	732	1190
	Q	2085	1263	534	868
	H	1581	958	405	658
29	L	3909	2369	1002	1628
	M	3035	1839	778	1264
	Q	2181	1322	559	908
	H	1677	1016	430	698
30	L	4158	2520	1066	1732
	M	3289	1994	843	1370
	Q	2358	1429	604	982
	H	1782	1080	457	742

Version	Error Correction	Numeric	Alphanumeric	Kanji	Binary
31	L	4417	2677	1132	1840
	M	3486	2113	894	1452
	Q	2473	1490	634	1030
	H	1897	1150	486	790
32	L	4686	2840	1201	1952
	M	3693	2238	947	1538
	Q	2670	1618	684	1112
	H	2022	1226	518	842
33	L	4965	3009	1273	2068
	M	3909	2369	1002	1628
	Q	2805	1700	719	1168
	H	2157	1307	553	898
34	L	5253	3183	1347	2188
	M	4134	2506	1060	1722
	Q	2949	1787	756	1228
	H	2301	1394	590	958
35	L	5529	3351	1417	2303
	M	4343	2632	1113	1809
	Q	3081	1867	790	1283
	H	2361	1431	605	983
36	L	5836	3537	1496	2431
	M	4588	2780	1176	1911
	Q	3244	1966	832	1351
	H	2524	1530	647	1051
37	L	6153	3729	1577	2563
	M	4775	2894	1224	1989
	Q	3417	2071	876	1423
	H	2625	1591	673	1093
38	L	6479	3927	1661	2699
	M	5039	3054	1292	2099
	Q	3599	2181	923	1499
	H	2735	1658	701	1139
39	L	6743	4087	1729	2809
	M	5313	3220	1362	2213
	Q	3791	2298	972	1579
	H	2927	1774	750	1219
40	L	7089	4296	1817	2953
	M	5596	3391	1435	2331
	Q	3993	2420	1024	1663
	H	3057	1852	784	1273

Maxi Code Command

1. Command Syntax <BA>
ESC + BA NN a , b , c , d d d d d d d d d,
　　　　　　　　　　e e e , f f f , n n • • n
　　　　NN = field number

<1B>$_{16}$ <42>$_{16}$ <41>$_{16}$ a , b , c , d d d d d d d d d,
　　　　　　　　　　　　e e e , f f f , n n • • n

2. Description

a	"Symbol number"	= Valid Range; 1-8
b	"Number of Symbols"	= Valid Range: 1-8

　　　　　　　　　　　　　　　　　* It is necessary to specify this parameter
　　　　　　　　　　　　　　　　　when split print is done. Usually specify
　　　　　　　　　　　　　　　　　a = b = 1.

c	"Mode"	= 2: For transfer only
		= 3: For transfer only
		= 4: Standard symbol
		= 6: For read machine only
d	" Postal Code"	= Valid Range: 000000-999999

　　　　　　　　　　　　　　　　　* For mode 2, specify the maximum digit to
　　　　　　　　　　　　　　　　　9 (number only) and for mode 3, the digit is
　　　　　　　　　　　　　　　　　fixed to 6 (Only Capital letters when
　　　　　　　　　　　　　　　　　alphanumerics are used)

e	"Country Code"	= Valid Range: 001-999 (number)
f	"Service Class"	= Valid Range: 001-999 (number)
n	"Low Priority Message"	= Valid Range: Alphanumerics, Symbols.

　　　　　　　　　　　　　　　　　* 00h cannot be specified in the
　　　　　　　　　　　　　　　　　print data.

Mode	Service Class	Country Code	Postal Code	Maximum Number of Print Data	
				Only Number	Combination of alphanumerics
2	3 digit fixed (only numeric)	3 digit fixed (only numeric)	9 digit maximum	123	84
3			6 digit fixed (alphanumerics)		
4	3 digits fixed 001	3 digits fixed 001	6 digits fixed 000000	138	93
6					

CHAPTER 10
Serial Interface

Serial Interface

- Interface Specifications

Protocol	Ready/Busy	(1 item, multi items selectable)
	XON/OFF	(1 item, multi items selectable)
	Status 3	(Multi item only)
Baud rate	2400, 4800, 9600, 19200 BPS	
Synchronize	Asynchronous mode	

Maximum receive buffer capacity	32K
	
	OK 32K
	Near full occurrence
	
	                     2Kbytes remained
	
	Near full cancellation
	
	                  8Kbytes remained	

Character construction	Data bit Start bit Stop bit Parity check	7 or 8 bit 1 bit 1 or 2 bit Even, Odd, None
Data Specification	ASC II (7 bit)	Graphic (8 bit)
Connector	Printer side DB-25S (Equivalent) Cable side DB-25P (Equivalent) Cable length less than 5m	
Transmission format		Start | b1 | b2 | b3 | b4 | b5 | b6 | b7 | b8 | Stop Note : b8 is omitted when set to 7 bit data
Signal level	High level : +5 ~ +12 V Low level : -5 ~ -12 V	

Ready/Busy

This is the hardware flow control for the serial interface on the DR printers. By raising/lowering the voltage level on Pin 20 of the RS232 port, the printer notifies the host when it is ready to receive data. Pin 40 (RS) and Pin 20 (DR) are the important signals on the printer for this method of flow control. The host must be capable of supporting this flow control method for it to function properly. The selection of 1 item or multi items print buffer can be set by DIP switch.

Data stream (ESC + "A" ~ ESC + "Z") from host might not be fully received by printer under the following conditions:
- Printer is in printing process during Single Job Buffer Mode.
- Printer is engaged with error condition.

1 : Cable connection

Host		Printer
FG	————————	1 FG
RD	◄————————	2 SD
SD	————————►	3 RD
CS	◄————————	4 RS
RS	————————►	5 CS
ER	————————►	6 DR
SG	————————	7 SG
DR	◄————————	20 ER
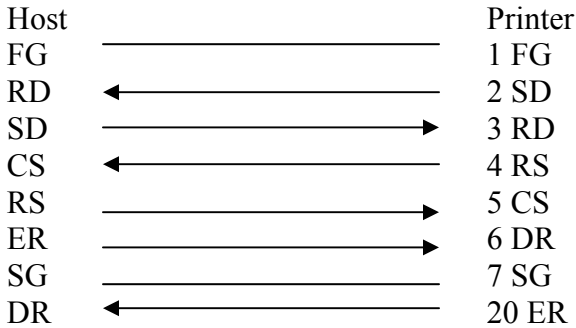
2 : Input/Output signal explanation

Pin No.	Signal Name	Direction	Content
1	F G	-	Frame ground
2	S D	Output	Data transmitted from printer to host
3	R D	Input	Data transmitted from host to printer
4	R S	Output	"Low" level when error occurs in printer
5	C S	Input	Always hold "High"
6	D R	Input	Always hold "High"
7	S G	-	Signal ground
20	E R	Output	"High" when printer is ready to receive data "Low" when various errors occur, when the printer is offline, and while printing in the Single Job Buffer Mode. It will also go "Low" when the data in the buffer reaches the Buffer Near Fall Level

XON / XOFF

X-on/X-off flow control must be used whenever hardware (Ready/Busy) flow control is not available or desirable. Instead of a voltage going high/low at pin 20, control characters representing "Printer Ready" (**X-on** = 11 hexadecimal) or "Printer Busy" (**X-off** = 13 hexadecimal) are transmitted by the printer on pin 2 (Transmit Data) to the host. In order for this method of flow to function correctly, the host must be capable of supporting it. **X-on/X-off** operates in a manner similar to the function of pin 20 (**DTR**) as previously explained. When the printer is first powered on and goes on-line, an **X-on** is sent out. In the Single Job Buffer mode, when the printer receives a viable job, it transmits an **X-off** and begins printing. When it is done printing, it transmits an **X-on**. In the Multi Job Buffer mode, the printer sends an **X-off** when the "Buffer Near Full" is reached and an **X-On** when the data level of the buffer drops below the "Buffer Available" mark. When the printer is taken offline manually, it transmits an **X-Off** indicating it cannot accept data. When it is placed back online manually, it sends an **X-On**, indicating it is again available for receipt of data. If an error occurs during printing (paper out, ribbon out), the printer sends nothing in the Single Job Buffer mode since the last character transmitted was an **X-Off**. When the error is cleared and the printer resumes printing, no **X-On** is sent until the current job is completed and the printer is once again ready to receive the next job. If it is in the Multi Job Buffer mode, it sends an **X-Off** as soon as an error condition is detected. When the error is cleared and the printer is placed back online, it transmits an **X-On** indicating it is again ready to accept data.

Data stream (ESC + "A" ~ ESC + "Z") from host might not be fully received by printer under the following conditions:
- Printer is in printing process during Single Job Buffer Mode
- Printer is engaged with error condition

1 : Cable connection

```
Host                                      Printer
FG      ——————————————————      1 FG
RD      ←—————————————————      2 SD
SD      —————————————————→      3 RD
SG      ——————————————————      7 SG
```
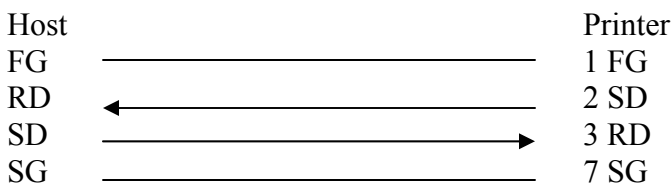

- Some host needs looping of RS and CS at host side to keep signal High.

2 : Input/Output Signal Explanation

Pin No.	Signal Name	Direction	Contents
1	F G	-	Frame ground
2	S D	Output	Data to be transmitted from printer to host
3	R D	Input	Data to be transmitted from host to printer
7	S G	-	Signal ground

Status 3 Protocol

1 : Status-3 protocol enables host to have full control of the printer by knowing the printer status. Printer sends status immediately upon receiving enquiry command from host. This protocol can only be used for multi items receive buffer setting.

Data stream (ESC + "A" ~ ESC + "Z") from host might not be fully received by printer under the following conditions:
- Printer is in printing process
- Printer is engaged with error condition

2 : Cable connection

```
Host                            Printer
FG    _____  1 FG
RD ◄_____    2 SD
SD    _____► 3 RD
SG    _____  7 SG
```
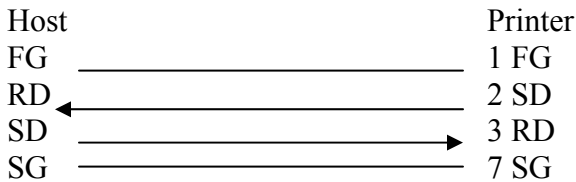
- Some host needs looping of RS and CS at host side to keep signal High

3 : Input/Output signal explanation

Pin No.	Signal Name	Direction	Contents
1	F G	-	Frame ground
2	S D	Output	Data to be transmitted from printer to host
3	R D	Input	Data to be transmitted from host to printer
7	S G	-	Signal ground

Status Transmission
Printer sends status based on 2 types of command. Status Request Command and Print Command. Following are details description on each command.

1 : Status Request Command

Printer status consists of ID No., status, remaining print quantity. Printer sends all spaces (20 Hex) as ID and all "0" as remaining print quantity under the following conditions:
- End of printing
- No print data

a)   Command   ENQ (05 Hex)
b)   Status format

					STX (02H)		
					ETX (03H)		
STX	ID	No.	Status	Remaining Print Quantity		ETX	(11 Byte)

The ID No. is set based on the ID sent from Host with <ID> command. For multiple print jobs, current printing job ID will be sent.

Status Summary Table

Description			ASCII	Hex
Normal mode (Off-line)	No error		0	3 0
	Buffer near full		2	3 2
On-line Mode	Receive wait	No error	A	4 1
		Buffer near full	C	4 3
	Printing	No error	G	4 7
		Buffer near full	I	4 9
	Dispense wait	No error	M	4 D
		Buffer near full	O	4 F
	Analyze, edit	No error	S	5 3
		Buffer near full	U	5 5
Error	Receive buffer full		a	6 1
	Head open		b	6 2
	Paper end		c	6 3
	Ribbon end		d	6 4
	Media error		e	6 5
	Sensor error		f	6 6
	Head error		g	6 7
	Card error		i	6 9
	Cutter error		j	6 A
	Other error (Interface error, machine error, etc)		k	6 B

Remarks :
- For status "S' & "U", remaining print quantity may not be set depending on the timing of data analyze and edit
- Print quantity may be different when printer is processing sequential numbering.

2 : Cancel Request Command

When receive Cancel Request Command from host, printer will clear all receive buffer contents after completion of current print job. Printer will send print end status.

      a) Command   CAN (18H)

      b) Status format

Status	Description
A C K (06H)	Printer performs requested command
N A K (15H)	Printer error

3 : Print Command

Printing will be commenced after receiving print command (ESC + "A" ~ ESC + "Z"). Printer sends back print end printer status.

      a) Status format

Status	Description
A C K (06H)	Printer performs requested command
N A K (15H)	Printer error

Return Sequence
1 : Normal

Host   Printer

ENQ (Status demanding command)

STATUS [ID No. = Space
        Status = Waiting reception
        Print sheet No.s = 000000]

Printing command [ID No. 05
        Print sheet No. s = 100]

Receive, Analyze, Edit

ACK (Completed correctly)

ENQ (Status demanding command)

STATUS [ID No. = 05
        Status = In editing
        Print sheet No. s = 00000000]

Printing action

ENQ (Status demanding command)

STATUS [ID No. = 05
        Status = In printing
        Print sheet No. s = 000100]

Print first sheet

Printing command [ID No. = 06
        Print sheet No. s = 50]

Print 2nd sheet   Receive, Analyze, Edit

ACK (Completed correctly)

Print 3rd sheet

ENQ (Status demanding command)

STATUS [ID No. = 05
        Status = Paper end
        Print sheet No. s = 000098]

Paper end error occur

Error cancel

ENQ (Status demanding command)

STATUS [ID No. = 05
        Status = In printing
        Print sheet No. s = 000098]

Print 3 rd sheet

ENQ (Status demanding command)

STATUS [ID No. = 05
        Status = In printing
        Print sheet No. s = 000001]

Print 1000 th sheet

ENQ (Status demanding command)

STATUS [ID No. = 06
        Status = In printing
        Print sheet No. s = 000050]

Print first sheet

Cancel Demanding Command
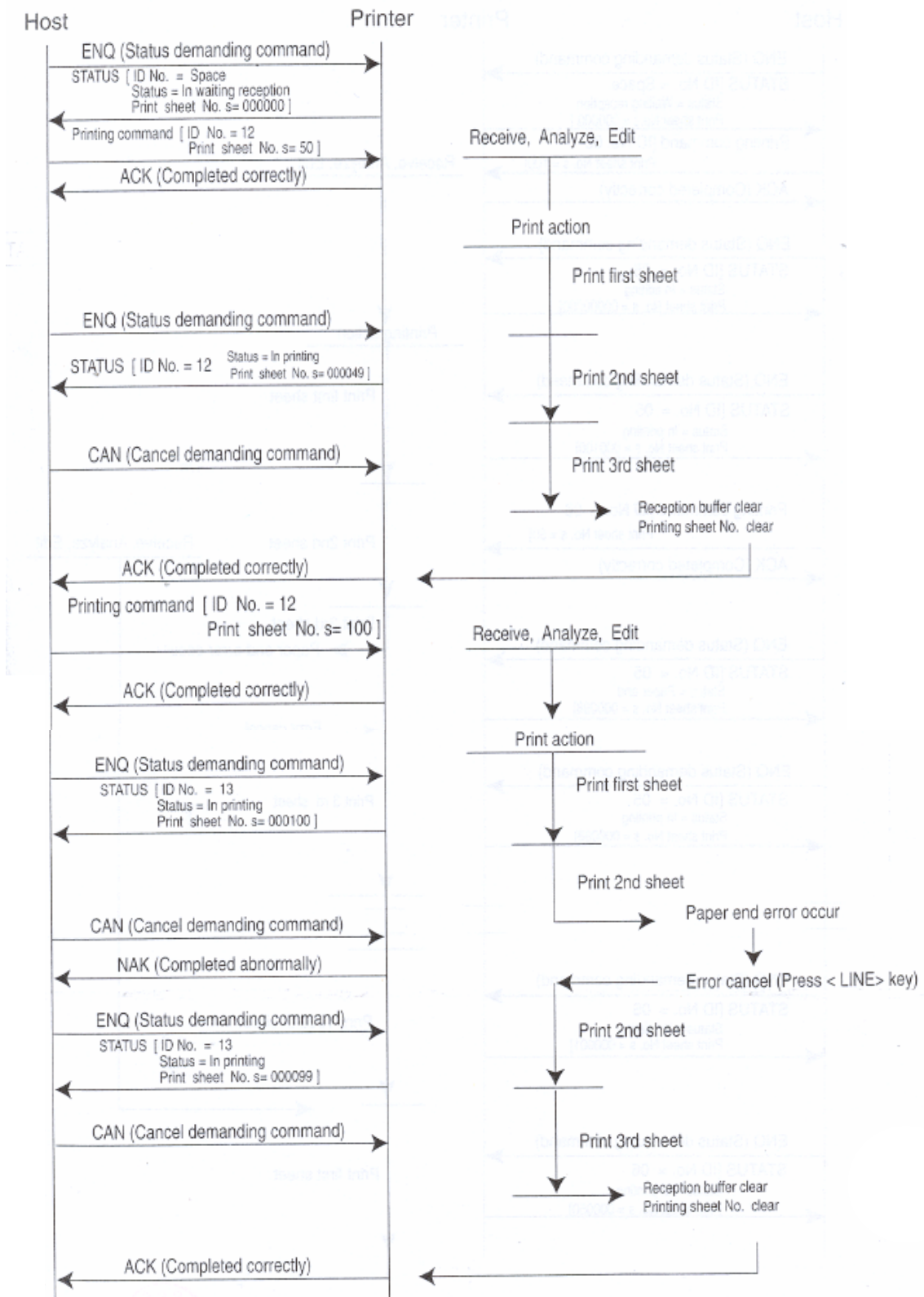
Reference Flow Chart
Refer to the flow chart below, when program is prepared on host side using this protocol.
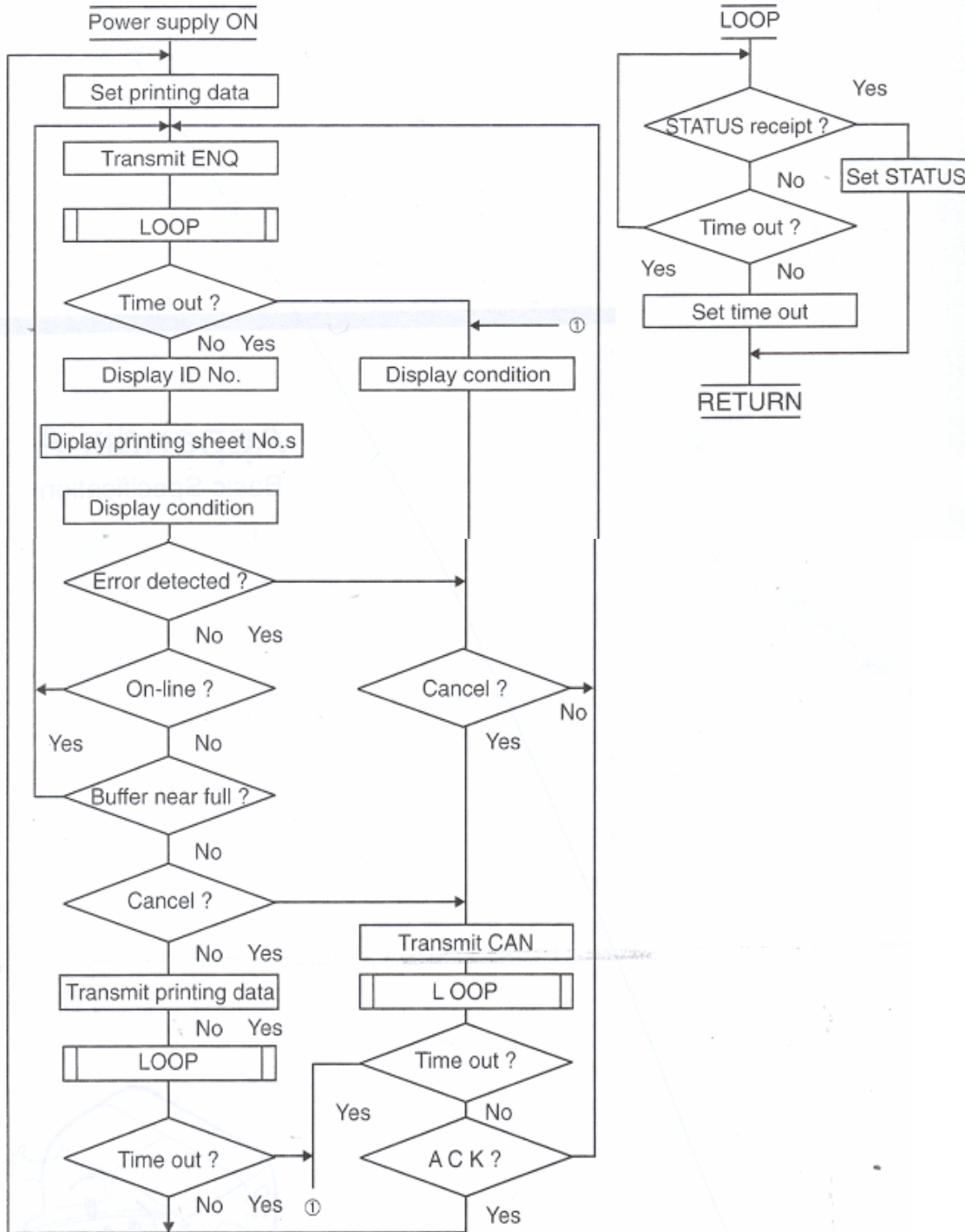
* In case error is identified in the printer, transmit printing data after confirming error cancellation by ENQ.

APPENDIX A
Basic Specification

DR 300 General Specifications

Head Density	8 dots/mm
Print Method	Thermal Transfer/Direct Thermal
CPU	32-bit RISC CPU
Print Speed	75, 100, 125 mm/second (Selectable)
Bar Code Type	UPC-A/E EAN-8 EAN-13 NW7 Code 39 ITF2/5 Code 128 UCC/EAN128 Bookland 2D: PDF417, Data Matrix, Vericode, QR code, Maxicode3 *2D barcode: online printing only
Bar Code Ratio	1:2, 1:3, 2:5 (Software defined)
Font Expansion	1-9 times (Both horizontally and vertically)
Font Type	U – Font** W5xP9 (Alphanumeric, notation) S – Font** W17xP17 (Alphanumeric, notation) M – Font** W24xP24 (Alphanumeric, notation) OCR – A Font W19xP22 (Alphanumeric, notation) OCR – B Font W20xP24 (Alphanumeric, notation) WB – Font W48xP48 (Alphanumeric, notation) WL – Font W48xP48 (Alphanumeric, notation) **IBM 850 Code Set Table
Print Area	Max W 80 mm x P 178 mm
Label Size	Width 32 – 80 mm Pitch 19 – 181 mm (Label size is inclusive of label web)
Label Thickness	0.1 – 0.26 mm
Operation Panel	Key: LINE Key, FEED Key LCD: 8 digits x 2 lines (English character display, Black Lit) (only applicable to On-line use) STATUS: 2 – colour LED (Red, Green)
Adjustment VR	PRINT : Print Darkness PITCH : Print Pitch OFFSET : Print Offset
User Mode	1. Print Darkness 2. Print Position Adjustment 3. Print Speed 4. Offset Adjustment

Features	Graphics Print, Sequential Numbering, Line/Box, Print Position Adjustment, Back – Feed, Tear – Off, Calendar, Inverse Image, Zero Slash Selection, Non Standard Code Setting, Hex Dump, Customized Design Character (16 x 16, 24 x 24 dots)
Self Check/Detection	Head Error, Paper End, Ribbon End, Head Open, Memory Card Error, Test Print
Option	Touch Screen Unit, Cutter Unit, Dispenser Unit, PC Card (JEIDA Type II), Scanner, Cut Ticket/Tag Receiver, Full Qwerty Keyboard, Rewind Unit.

Label & Carbon Ribbon Specification

Label	Size	Min. W 32 mm – Max W 80 mm (inclusive of label web) Min. P 19 mm – Max W 181 mm (inclusive of label web)
	Thickness	0.1 mm – 0.26 mm
	Type	Rolled Paper
	Diameter	Max outer diameter : 250 mm
Carbon Ribbon	Type	Wax, Wax/Resin
	Length	300m/roll
	Width	Max 84 mm
	Winding	Face-in type

Operating Environmental Condition

Input Power Supply Voltage	Voltage AC 220V + - 10%	
Power Consumption	Max 190 VA 130 W	
Environmental Condition	Operating temperature	5~40 d.c.
	Operating humidity	30~80 d.c. (No Condensation)
	Storage temperature	-5~60 d.c.
	Storage humidity	30~90 d.c. (No Condensation)
	Except paper and carbon ribbon	

DR 300 Software Specifications

	DR300 Software Specification	
	On-line specification	Stand alone specification
Format registration		Main body 10 formats
Recall function (Printer Main Body)		(50 fields + 50 formats on card)
Sequential numbering	Yes (Numeric only)	Yes (Numeric only)
Copy Function	No	Yes
Box/Line print	Yes	Yes
Graphic	BMP file	BMP file (card stored)
Reverse print	Yes	Yes
Calendar function	Yes	Yes
Alphanumeric table	No	Yes
10 Item function (Store in PC card)	No	Yes (card stored)
Price field function	No	Yes
C/D calculation	No	Yes
Input check function	No	Yes
Rotate copy	No	Yes
Image copy	No	Yes
Customized character	Yes	Yes
Mode	Continuous mode, cutter mode, dispense mode, tear off mode.	Continuous mode, cutter mode, dispense mode, tear off mode.
Media size designation	Media parameter	Media parameter
Printing offset	Yes	Yes
Display setting	No	Yes
Startup display setting	No	Yes
Format control function	No	Yes
Card maintenance function	No	Yes
Online maintenance function	No	Yes
2D Codes	Yes (PDF 417, QR, Data code)	No
Truetype fonts	Yes (S/ware or card)	Yes (Card stored)
Preset data	No	Yes (1MB card, 900 sets)
£ p currency change	No	Yes
Adjustable guard bars	Software	Yes

Printer Main Body Operation Unit

LCD Display Unit	8 x 2 lines	LCD display is achieved when touch screen is not connected.
Operation Key	Feed Key	Paper feeding.
	Line Key	Temporary halts printing (print pause)
LED	2 colour LED	RED : error display GREEN : On-line
DIP Switch	DIPSW 1	Serial interface (setting baud rate, etc)
	DIPSW 2	Setting operation mode, etc. Setting Hex dump function
	DIPSW 3	Setting zero slash and non-standard protocode
Variable Control VR	PITCH	Pitch adjustment
	OFFSET	Cutter, dispense, tear off position adjustment
	PRINT	Print darkness adjustment

DIP-Switch Setting

DIP-Switch Setting
DIP-Switch shall be set when printer is off.
Each DIPSW setting is described below.
*All are set to OFF position as factory defaults.

DIPSW 1

No	Setting	Content
1	ON	Data bit No. = 7
	OFF	Data bit No. = 8
2 3	Separate Sheet 1	Parity setting (None, Even, Odd)
4	ON OFF	Stop bit = 2 Stop bit = 1
5 6	Separate Sheet 2	Baud rate setting (2400, 4800, 9600, 19200)
7 8	Separate Sheet 3	Protocol setting (Ready/Busy, Xon-Xoff, Status-3)

Separate sheet 1 (Parity setting)

2	3	Content
ON	ON	(Reserved)
ON	OFF	Odd
OFF	ON	Even
OFF	OFF	None

Separate sheet 2 (Baud rate setting)

5	6	Content
ON	ON	2400 bps
ON	OFF	4800 bps
OFF	ON	19200 bps
OFF	OFF	9600 bps

Separate sheet 3 (Protocol setting)

7	8	Content
ON	ON	(Reserved)
ON	OFF	STATUS 3
OFF	ON	XON-OFF
OFF	OFF	Ready/Busy

DIPSW 2

No.	Setting	Content
1	ON	Direct Thermal
	OFF	Thermal Transfer
2	ON	(Reserved) / Reflecting type sensor
	OFF	(Reserved) / See through type sensor
3	ON	Head Check, Yes
	OFF	Head Check, No
4	ON	Hex dump function, Yes
	OFF	Hex dump function, No
5	ON	Multi items receive mode
	OFF	1 item receive mode
6	ON	(Reserved)
	OFF	(Reserved)
7	ON	Size detection, Yes
	OFF	Size detection, Yes
8	ON	Tear off (Dispense), Yes
	OFF	Tear off (Dispense), No

* Pitch sensor (DSW2-2) is effective only during service, test print. It is void during test print.

DIPSW 3

No.	Setting	Content
1	ON	Enable: Change parameter by touch screen
	OFF	Enable: Change parameter by touch screen
2	ON	(Reserved)
	OFF	(Reserved)
3	ON	(Reserved)
	OFF	(Reserved)
4	ON	(Reserved)
	OFF	(Reserved)
5	ON	(Reserved)
	OFF	(Reserved)
6	ON	(Reserved)
	OFF	(Reserved)
7	ON	Non-standard protocode
	OFF	Standard protocode
8	ON	Zero without slash
	OFF	Zero with slash

APPENDIX B
Character Code Table

U-Font character code table

U-Font (5 x 9 dots)
IBM850

	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0		0	@	P	`	p	Ç	É	á			ð	Ó	-
1	!	1	A	Q	a	q	ü	æ	í			Ð	ß	±
2	"	2	B	R	b	r	é	Æ	ó			Ê	Ô	=
3	#	3	C	S	c	s	â	ô	ú			Ë	Ò	¾
4	$	4	D	T	d	t	ä	ö	ñ			È	õ	¶
5	%	5	E	U	e	u	à	ò	Ñ	Á			Õ	§
6	&	6	F	V	f	v	å	û	ª	Â	ã	í	µ	÷
7	'	7	G	W	g	w	ç	ù	º	À	Ã	Î	þ	¸
8	(	8	H	X	h	x	ê	ÿ	¿	©		Ï	Þ	°
9	)	9	I	Y	i	y	ë	Ö	®				Ú	¨
A	*	:	J	Z	j	z	è	Ü	¬				Û	·
B	+	;	K	[	k	{	ï	ø	½				Ù	¹
C	,	<	L	\	l	|	î	£	¼				ý	³
D	-	=	M	]	m	}	ì	Ø	¡			¦	Ý	²
E	.	>	N	^	n	~	Ä	×	«	¥		Ì	¯	
F	/	?	O	_	o		Å	ƒ	»					´

S-Font character code table

S-Font (17 x 17 dots)
IBM850

	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0		0	@	P	`	p	Ç	É	á			ð	Ó	-
1	!	1	A	Q	a	q	ü	æ	í			Ð	ß	±
2	"	2	B	R	b	r	é	Æ	ó			Ê	Ô	=
3	#	3	C	S	c	s	â	ô	ú			Ë	Ò	¾
4	$	4	D	T	d	t	ä	ö	ñ			È	õ	¶
5	%	5	E	U	e	u	à	ò	Ñ	Á			Õ	§
6	&	6	F	V	f	v	å	û	ª	Â	ã	í	µ	÷
7	'	7	G	W	g	w	ç	ù	º	À	Ã	Î	þ	¸
8	(	8	H	X	h	x	ê	ÿ	¿	©		Ï	Þ	°
9	)	9	I	Y	i	y	ë	Ö	®				Ú	¨
A	*	:	J	Z	j	z	è	Ü	¬				Û	·
B	+	;	K	[	k	{	ï	ø	½				Ù	¹
C	,	<	L	\	l	|	î	£	¼				ý	³
D	-	=	M	]	m	}	ì	Ø	¡			¦	Ý	²
E	.	>	N	^	n	~	Ä	×	«	¥		Ì	¯	
F	/	?	O	_	o		Å	ƒ	»					´

M-Font character code table

M-Font (24 x 24 dots)
IBM850

	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0		0	@	P	`	p	Ç	É	á				ð	Ó	-
1	!	1	A	Q	a	q	ü	æ	í				Ð	ß	±
2	"	2	B	R	b	r	é	Æ	ó				Ê	Ô	=
3	#	3	C	S	c	s	â	ô	ú				Ë	Ò	¾
4	$	4	D	T	d	t	ä	ö	ñ				È	õ	¶
5	%	5	E	U	e	u	à	ò	Ñ	Á			ı	Õ	§
6	&	6	F	V	f	v	å	û	ª	Â	ã	Í	µ	÷
7	'	7	G	W	g	w	ç	ù	º	À	Ã	Î	þ	¸
8	(	8	H	X	h	x	ê	ÿ	¿	©			Ï	Þ	°
9	)	9	I	Y	i	y	ë	Ö	®				Ú		¨
A	*	:	J	Z	j	z	è	Ü	¬				Û		·
B	+	;	K	[	k	{	ï	ø	½				Û	¹	
C	,	<	L	\	l	|	î	£	¼				ý	³	
D	-	=	M	]	m	}	ì	Ø	¡	¢		¦	Ý	²	
E	.	>	N	^	n	~	Ä	×	«	¥		Ì	Ì	¯	
F	/	?	O	_	o		Å	ƒ	»				´		

WB-Font character code table

WB-Font (48 x 48 dots)
IBM850

	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0		0	@	P	`	p	Ç	É	á				ð	Ó	-
1	!	1	A	Q	a	q	ü	æ	í				Ð	ß	±
2	"	2	B	R	b	r	é	Æ	ó				Ê	Ô	=
3	#	3	C	S	c	s	â	ô	ú				Ë	Ò	¾
4	$	4	D	T	d	t	ä	ö	ñ				È	õ	¶
5	%	5	E	U	e	u	à	ò	Ñ	Á			ı	Õ	§
6	&	6	F	V	f	v	å	û	ª	Â	ã	Í	µ	÷
7	'	7	G	W	g	w	ç	ù	º	À	Ã	Î	þ	¸
8	(	8	H	X	h	x	ê	ÿ	¿	©			Ï	Þ	°
9	)	9	I	Y	i	y	ë	Ö	®				Ú		¨
A	*	:	J	Z	j	z	è	Ü	¬				Û		·
B	+	;	K	[	k	{	ï	ø	½				Û	¹	
C	,	<	L	\	l	|	î	£	¼				ý	³	
D	-	=	M	]	m	}	ì	Ø	¡	¢		¦	Ý	²	
E	.	>	N	^	n	~	Ä	×	«	¥		Ì	Ì	¯	
F	/	?	O	_	o		Å	ƒ	»				´		

WL-Font character code table

WL-Font (48 x 48 dots)
IBM850

	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0		0	@	P	`	p	Ç	É	á			ð	Ó	-
1	!	1	A	Q	a	q	ü	æ	í			Ð	ß	±
2	"	2	B	R	b	r	é	Æ	ó			Ê	Ô	=
3	#	3	C	S	c	s	â	ô	ú			Ë	Ò	¾
4	$	4	D	T	d	t	ä	ö	ñ			È	õ	¶
5	%	5	E	U	e	u	à	ò	Ñ	Á		ı	Õ	§
6	&	6	F	V	f	v	å	û	ª	Â	ã	Í	µ	÷
7	'	7	G	W	g	w	ç	ù	º	À	Ã	Î	þ	¸
8	(	8	H	X	h	x	ê	ÿ	¿	©		Ï	Þ	°
9	)	9	I	Y	i	y	ë	Ö	®				Ú	¨
A	*	:	J	Z	j	z	è	Ü	¬				Û	·
B	+	;	K	[	k	{	ï	ø	½				Ù	¹
C	,	<	L	\	l	|	î	£	¼				ý	³
D	-	=	M	]	m	}	ì	Ø	¡	¢		¦	Ý	²
E	.	>	N	^	n	~	Ä	×	«	¥		Ì	¯	
F	/	?	O	_	o		Å	ƒ	»				´	

OCR A-Font character code table

OCR A-Font (15 x 22dots)
(OCR A style character

	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0		0		P										
1		1	A	Q										
2		2	B	R										
3		3	C	S										
4	$	4	D	T										
5		5	E	U										
6		6	F	V										
7		7	G	W										
8		8	H	X										
9		9	I	Y										
A			J	Z										
B			K											
C			L											
D			M											
E	.	>	N											
F	/		O											

OCR A-Font character code table

OCR A-Font (15 x 22dots)
(OCR A style character

	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0		0	@	P										
1	!	1	A	Q										
2	"	2	B	R										
3	#	3	C	S										
4	$	4	D	T										
5	%	5	E	U										
6	&	6	F	V										
7	'	7	G	W										
8	(	8	H	X										
9	)	9	I	Y										
A	*	:	J	Z										
B	+	;	K	¥										
C	,	<	L	¥										
D	-	=	M											
E	.	>	N											
F	/	?	O											